

NOKIA

List of AT Commands for Nokia 22

Nokia 22

List of AT Commands

NOKIA
CONNECTING PEOPLE

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Abbreviations

AT	Attention
BCD	Binary Coded Decimal
CBM	Cell Broadcast Message
CIS	PCMCIA Card Information Structure
CLI	Calling Line Identity
COL	Connected Line identity
COR	Configuration Option Register
CR	Carriage Return
CTS	Clear To Send
DCD	Data Carrier Detect
DCE	Data Circuit-terminating Equipment; see TA
DTE	Data Terminal Equipment; see TE
DTMF	Dual Tone Multiple Frequency
DTR	Data Terminal Ready
DSR	Data Set Ready
EMC	Electro-Magnetic Compatibility
ERL	Echo Return Loss
ESD	Electro-Static Discharge
GSM	Groupe Special Mobile, Global System for Mobile communications
HSCSD	High Speed Circuit Switched Data
IMEI	International Mobile station Equipment Identity
IRA	International Reference Alphabet
ISDN	Integrated Services Digital Network
ITU	International Telecommunication Union
IWF	Interworking Function
ME	Mobile Equipment, e.g. a GSM phone
MO	Mobile Originated
MT	Mobile Terminated
MS	Mobile Station
MSISDN	Mobile Station ISDN Number
PC	Personal Computer
PCM	Pulse Code Modulation
PDU	Protocol Data Unit
PIN	Personal Identity Number
PUK	Personal Unblocking Key
RI	Ring Indicator
RLP	Radio Link Protocol
RTS	Request To Send
SIM	Subscriber Identity Module
SM	Short Message
SMS	Short Message Service
SMSC	Short Message Service Centre
TA	Terminal Adapter, the physical equipment where AT command interpreter resides (May be combined with ME)
TE	Terminal Equipment, the physical equipment from where applications communicate with TA using AT commands
TIA	Telecommunications Industry Association
UART	Universal Asynchronous Receiver Transmitter
USRT	Universal Synchronous Receiver Transmitter
USSD	Unstructured Supplementary Service Data

1 INTRODUCTION

This document describes the AT commands that can be used to operate the Nokia 22 PBX connectivity terminal. Other specifications on the terminal can be found in the *Nokia 22 User's Guide* and *Nokia 22 Operator's Guide*.

All the mandatory and optional ITU-T V.25ter /1/, ETS GSM 07.07 /2/, and ETS GSM 07.05 /3/ commands that are applicable to the Nokia 22 are included in the Nokia 22 command set. The 'de facto' commands that are widely used with modems are also supported. Note that the ITU-T V.25ter is a combination of three TIA standards (TIA-602, TIA-615, IS-131).

The Nokia 22 can be used as an adapter for a Group 3 facsimile terminal that supports facsimile Service Classes 1, 2 and 2.0. The supported facsimile AT commands are listed according to the standards in which they are specified: Service Class 1 TIA-578-A /4/, Service Class 2.0 TIA-592 /5/ and Service Class 2 TIA SP-2388 /6/. TIA SP-2388 is a draft of a coming standard, but here it is referred to as a public standard.

The Nokia 22 can be operated using a compatible computer or other devices with a 9-pin RS232 connector.

2 DATA CONNECTIONS

The Nokia 22 supports non-transparent and transparent data connections and High Speed Circuit Switched Data (HSCSD) in non-transparent mode, which enables a higher data transfer rate. Time slot usage is presented as the number of up and down links. The Nokia 22 data transfer modes are presented in Table 1.

Table 1. The Nokia 22 data transfer modes.

Data transfer mode	Mode	Data rate
Non-transparent data	Asynchronous data	9600 kbps
	Asynchronous data	14400 kbps
	Asynchronous data HSCSD	Multislot (1+1, 2+2, 3+1)
Transparent	Asynchronous data	2400 kbps
	Asynchronous data	4800 kbps
	Asynchronous data	9600 kbps
	Asynchronous data	14400 kbps

3 AT COMMAND SYNTAX

For basic information on the AT command syntax, refer to section V.25ter and to the GSM 07.07 section 4. This chapter describes the three different AT command formats and the default value mechanisms for their parameters.

3.1 Register commands

Table 2. Register command format in command description subsections			
	Command	Response	<n> values
Set	Sn=<n>		x..y (default z)
Read	Sn?	<n>	xxx..yyy

The register command factory default value (&F) is given in parentheses under the column ' <n> values'. The existence of a register command can be queried by giving a command without equal or question marks (i.e. AT<n> returns OK, but it does not change the <n> setting). <n> cannot be omitted when its value is set (i.e. AT<n>= returns ERROR).

3.1.1 Basic commands

Table 3. Basic command format in command description subsections		
	Command	Description
Set/execute	CMD[x]	for value x
	CMDy	for value y

The commands D (dial), A (answer) and O (return to online data state) include also columns for possible result codes.

The basic command (no '+' prefix) &F default value is underlined. If no value is underlined, the setting of that command is not stored in the non-volatile memory (the command &Y is an exception). If the command parameter is in brackets (usually zero), the parameter can be omitted.

3.1.2 Extended commands

Table 4. Extended command format in command description subsections				
	Command	Response	Default	+cme error/+cms error
Set/execute	+CMD[=<x>,...]	[+CMD: <y>,...]	[x,...]	[x]
Read	+CMD?	+CMD: <z>[,...]		[x]
Test	+CMD=?	[+CMD: ...]		[x]

The extended command ('+' prefix) parameter default values are given in a separate column. If the default value is not in brackets, the default value is the &F default value of the corresponding parameter. When such a parameter is omitted from a command, its value remains the same as before. If the default value is in brackets, this value shall be used when the parameter is omitted

from the command line. The setting of such a parameter is not stored in the memory. If a parameter has no default value, it must always be given.

NOTE: Voice (+V) and fax (+F) commands do not exactly follow this format.

GSM commands can also return a +CME ERROR or +CMS ERROR final result code, when the error is related to the ME or network functionality. The last column indicates whether these codes can be returned. The presentation of +CME ERROR can be controlled with the +CMEE command.

4 TE-TA INTERFACE COMMANDS

4.1 V.25ter

4.1.1 S3 Command line termination character

	Command	Response	<n> values
Set	S3=<n>		0..127 (default 13)
Read	S3?	<n>	000..127

The S3 command sets the decimal IA5 value of command line termination used by the DCE as a part of the header, trailer, and terminator for result codes and information text, along with the S4 parameter (see the description of the V command for usage).

If the value of S3 is changed on a command line, the result code issued in response to that command line will use the new value of S3. For example, if S3 was previously set to 13 and the command line "ATS3=50" is issued, the result code issued will use the character with the ordinal value 50 (IA5 3/2) in place of the CR.

4.1.2 S4 Response formatting character

	Command	Response	<n> values
Set	S4=<n>		0..127 (default 10)
Read	S4?	<n>	000..127

The S4 command sets the decimal IA5 value of the character generated by the DCE as a part of the header, trailer, and terminator for result codes and information text, along with the S3 parameter (see the description of the V command for usage).

If the value of S4 is changed in a command line, the result code issued in response to that command line will use the new value of S4.

4.1.3 S5 Command line editing character

	Command	response	<n> values
Set	S5=<n>		0..127 (default 8)
Read	S5?	<n>	000..127

The S5 command sets the decimal IA5 value of the character recognised by the DCE as a request to delete the immediately preceding character from the command line.

4.1.4 E Command echo

	Command	Description
Set	E[0]	no echo
	E1	echo

The E command determines whether or not the DCE echoes characters received from the DTE during the command state and the online command state.

4.1.5 Q Result code suppression

	Command	Description
Set	Q[0]	transmit codes
	Q1	suppress codes

The Q command determines whether the DCE transmits result codes to the DTE. When result codes are being suppressed, no portion of any intermediate, final, or unsolicited result code – header, result text, line terminator, or trailer – is transmitted. Information text transmitted in response to commands is not affected by this command.

4.1.6 V DCE response format

	Command	Description
Set	V[0]	numeric V.25ter basic syntax result codes, limited headers and trailers
	V1	Verbal V.25ter basic syntax result codes, full headers and trailers

The V command determines the contents of the header and trailer transmitted with result codes and information responses. It also determines whether the result codes are transmitted in numeric or verbal format. The text portion of information responses is not affected by this setting. The command S3 and S4 settings affect header and trailer formatting. Note that the result codes defined in GSM 07.07 and 07.05 have only verbal values.

4.1.7 X Result code selection and call progress monitoring control

	Command	Description
Set	X[0]	OK, CONNECT, RING, NO CARRIER, ERROR codes enabled
	X1	also CONNECT 1200, CONNECT 2400 enabled
	X2	same as value 1
	X3	also BUSY enabled
	X4	also NO ANSWER enabled
	X5	also CONNECT 4800 (or higher data rates), CARRIER, DELAYED, BLACKLISTED enabled

The X command defines the call progress result codes that are sent from the Nokia 22 to the DTE. When BUSY, NO ANSWER, DELAYED or BLACKLISTED are not enabled, NO CARRIER is used instead. When CONNECT <rate> with a correct data <rate> is not enabled, CONNECT is used instead. This command only affects the presentation of the result codes mentioned in this table.

4.1.8 &C Circuit 109 (received line signal detector) behaviour

	Command	Description
Set	&C[0]	always on
	&C1	normal operation

The &C command determines how the state of the circuit 109 relates to the detection of a received line signal from the distant end. Changing the parameter will take effect immediately in both command and online command states.

In the &C1 mode of operation, the circuit 109 is on during the connection. The circuit 109 is also known as a DCD or carrier signal.

4.1.9 &D Circuit 108 (data terminal ready) behaviour

	Command	Description
Set	&D[0]	DTR on->off ignored
	&D1	DTR on->off causes transition to on-line command state if a call is in progress
	&D2	DTR on->off causes hang-up
	&D3	DTR on->off causes hang-up and performs reset, like Z

The &D command determines how the DCE responds when the circuit 108/2 is changed from ON to OFF during the online data state. The circuit 108 is also known as DTR signal.

4.1.10 +IPR Fixed DTE rate

	Command	Response	Default
Set	+IPR=<rate>		0
Read	+IPR?	+IPR: <rate>	
Test	+IPR=?	+IPR: (0),(9600,14400,19200,28800,38400,57600,115200)	

The +IPR command sets the data rate at which the DCE will accept commands. The specified rate takes effect immediately following the issuance of the current command line.

NOTE: The reset commands Z and &F do not change this setting.

Defined values

<rate> is the bit transmission rate in one second

4.1.11 +ICF DTE-DCE character framing

	Command	Response	Default
Set	+ICF=<format>,<parity>		[3,3]
Read	+ICF?	+ICF: <format>,<parity>	
Test	+ICF=?	+ICF: (3,5),(0-3)	

The +ICF command is used to determine the local serial port start-stop character framing that the Nokia 22 uses when accepting DTE commands and when transmitting information text and a result.

NOTE: The reset commands Z and &F do not change this setting.

Defined values

<format> determines the number of bits in the data bits, the presence of a parity bit, and the number of stop bits in the start-stop frame.

- 3 8 data, 1 stop
- 5 7 data, 1 parity, 1 stop

<parity> determines how the parity bit is generated and checked, if present.

- 0 odd
- 1 even
- 2 mark
- 3 space

4.1.12 +IFC DTE-DCE local flow control

	Command	Response	Default
Set	+IFC=<dce-by-dte>,<dte-by-dce>		2,2
Read	+IFC?	+IFC: <dce-by-dte>,<dte-by-dce>	
Test	+IFC=?	+IFC: (0-3),(0-2)	

The +IFC controls the operation of a local flow control between the DTE and the Nokia 22.

Defined values

<dce-by-dte> specifies the method to be used by the DTE to control the flow of the received data from the Nokia 22

<dte-by-dce> specifies the method to be used by the Nokia 22 to control the flow of the transmitted data from the DTE

- 0 no flow control
- 1 software flow control (XON/XOFF)
- 2 hardware flow control (RTS/CTS)
- 3 software flow control (XON/XOFF), with flow control characters passed also to the remote DCE

4.1.13 +ILRR DTE-DCE local rate reporting

	Command	Response	Default
Set	+ILRR=<n>		0
Read	+ILRR?	+ILRR: <n>	
Test	+ILRR=?	+ILRR: (0,1)	

The +ILRR command controls whether the extended-format "+ILRR:<rate>" information text is transmitted from the Nokia 22 to the DTE. The <rate> reported represents the current DTE-DCE rate. If enabled, the intermediate result code is transmitted after any error control or data compression reports are transmitted and before any final result code (i.e. CONNECT) is transmitted.

4.1.14 +ES Error control selection

	Command	Response	default
set	+ES=<orig-rqst>,<orig-fbk>,<ans-fbk>		4,0,2
read	+ES?	+ES: <orig-rqst>,<orig-fbk>,<ans-fbk>	
test	+ES=?	+ES: (0-4),(0,2-4),(0-2,4-6)	

Mandatory when the V.42 error control is implemented. See the ITU-T Recommendation V.25ter, section 6.5.1. These settings are only used in transparent data calls (see +CBST). The supported parameter values depend on the V.42 modes that are supported. Fallback to direct mode is not supported by Nokia products.

4.1.15 +EB Break handling in error control operation

	Command	Response	default
set	+EB=<break-sel>,<timed>,<def-length>		1,0,30
read	+EB?	+EB: <break-sel>,<timed>,<def-length>	
test	+EB=?	+EB: (0-3),(0,1),(0-254)	

Mandatory when the V.42 error control is implemented. See the ITU-T Recommendation V.25ter, section 6.5.2. These settings are only used in transparent data calls (see +CBST) with V.42 enabled (see +ES).

4.1.16 +EFCS 32-bit frame check sequence

	Command	response	Default
set	+EFCS=<value>		0
read	+EFCS?	+EFCS: <value>	
test	+EFCS=?	+EFCS: (0)	

Mandatory when the V.42 error control is implemented. See the ITU-T Recommendation V.25ter, section 6.5.4. Controls the use of the 32-bit frame check sequence option in the V.42 error control mode. The 32-bit FCS is not supported by Nokia products.

4.1.17 +ER Error control reporting

	Command	response	default
Set	+ER=<mode>		0
Read	+ER?	+ER: <mode>	
Test	+ER=?	+ER: (0,1)	

Mandatory when the V.42 error control is implemented. See the ITU-T Recommendation V.25ter, section 6.5.5. Controls the presentation of the +ER intermediate result code.

4.1.18 +ETBM Call termination buffer manage

	Command	response	default
Set	+ETBM=<txBuf>,<rxBuf>,<timer>		1,1,20
Read	+ETBM?	+ETBM: <txBuf>,<rxBuf>,<timer>	
Test	+ETBM=?	+ETBM: (0-2),(0-2),(0-30)	

Mandatory when the V.42 error control is implemented. See the ITU-T Recommendation V.25ter, section 6.5.6. These settings may also be used in a non-transparent data call buffer management.

4.2 De facto

4.2.1 S25 Detect DTR change time

	Command	Response	<n> values
Set	S25=<n>		0..255 (default 0)
Read	S25?	<n>	000..255

The S25 command sets the time in seconds for reacting to the DTR signal change. The value 255 inhibits the signal change recognition. See also the &D command.

4.2.2 &S DSR signal behaviour

	Command	Description
Set	&S[0]	always on
	&S1	no effect

The &S command is ignored, the DSR is always ON.

4.2.3 &K Select flow control

	Command	Description
Set	&K[0]	no flow control
	&K3	hardware flow control (RTS/CTS)
	&K4	software flow control (XON/XOFF)

The &K command changes the same setting as the +IFC. The use of +IFC is recommended.

5 GENERIC COMMANDS

5.1 V.25ter

5.1.1 Z Reset to default configuration

	Command	Description
Execute	Z[0]	reset to stored profile 0
	Z1	reset to stored profile 1

The settings that are not stored in a profile (refer to &W) will be reset to their factory defaults (refer to &F). The implementation is according to GSM 07.07 section 5.7.

5.1.2 &F Set to factory-defined configuration

	Command	Description
Execute	&F[0]	reset to factory defaults

This command instructs the Nokia 22 to set default values to all parameters. The command parameters that are reset to their factory defaults are: S3, S4, S5, E, Q, V, X, &C, &D, +IFC, +ILRR, S25, &S, +CSCS, S0, S7, S8, S10, +DS, +DR, S2, S12, +CSTA, +CMOD, +CBST, +CRLP, +CR, +CRC, +CSNS, +CREG, +COPS (only <format>), +CLIP, +CLIR, +COLP, +CCWA (only <n>), +CUSD (only <n>), +CSSN, +CMER, +CPBS, +CMEE, +CSMS, +CPMS, +CMGF, +CSCA, +CSMP, +CSDH, +CSCB, +CNMI.

5.1.3 I Request identification information

	Command	Response	Description
Execute	I[0]	Nokia Mobile Phones	same as +GMI
	I1	IMEI	same as +GSN
	I2	SWx.xx	same as +GMR
	I3	22 RPM-3 GSM900/1800	same as +GMM
	I4..I13		Ignored values

5.1.4 +GMI Request TA manufacturer identification

	Command	Response
Execute	+GMI	Nokia Mobile Phones

5.1.5 +GMM Request TA model identification

	Command	Response
Execute	+GMM	22 RPM-3 GSM900/1800

5.1.6 +GMR Request TA revision identification

	Command	Response
Execute	+GMR	SWx.xx

5.1.7 +GSN Request TA serial number identification

	Command	Response
Execute	+GSN	IMEI

5.1.8 +GCAP Request complete capabilities list

	Command	Response
Execute	+GCAP	+GCAP: +CGSM, +FCLASS, +DS +ES

Defined values

+CGSM This is not a command to be used, but it refers to the support of the GSM 07.07 AT command set. The implementation is according to GSM 07.07 section 5.7.

+FCLASS A command to query the support of different facsimile classes

+DS Data Compression

5.2 De facto

5.2.1 &V View configuration

	Command	Description
Execute	&V	Show current and stored profile settings (all command parameter values defined under &F plus &Y setting)

5.2.1.1 &W Store configuration

	Command	Description
Execute	&W[0]	Store to profile 0
	&W1	Store to profile 1

The &W command stores the current parameter values in the given profile. The command parameters that are stored in a profile are the same as those listed under the &F command, except for the parameters of the following commands that are not stored: +CMOD, +CSCA, +CSMP.

5.2.1.2 &Y Select power-up configuration

	Command	Description
Set	&Y[0]	Power-up uses profile 0
	&Y1	Power-up uses profile 1

The &Y command defines the profile from which parameters are loaded when the Nokia 22 is activated. This setting is not part of the settings that are stored in a profile. The &F command does not affect this setting.

5.3 GSM 07.07

5.3.1 +CGMI Request ME manufacturer identification

	Command	Response
Execute	+CGMI	Nokia Mobile Phones
Test	+CGMI=?	

5.3.2 +CGMM Request ME model identification

	Command	Response	+cme error
Execute	+CGMM	22 RPM-3 GSM900/1800	x
Test	+CGMM=?		

5.3.3 +CGMR Request ME revision identification

	Command	Response	+cme error
Execute	+CGMR	SWx.xx	x
Test	+CGMR=?		

5.3.4 +CGSN Request ME serial number identification

	Command	Response	+cme error
Execute	+CGSN	IMEI	X
Test	+CGSN=?		

5.3.5 +CSCS Select TE character set

	Command	Response	Default
Set	+CSCS=<chset>		"8859-1"
Read	+CSCS?	+CSCS: <chset>	
Test	+CSCS=?	+CSCS: ("GSM", "HEX", "IRA", "PCCP437", "PCDN", "8859-1")	

The +CSCS command informs the Nokia 22 of the character set that is used by the DTE.

Defined values

<chset> DTE character set:

- "GSM" GSM default alphabet (GSM 03.38 subclass 6.2.1); this setting easily causes software flow control (XON/XOFF) problems.
- "HEX" Character strings consist only of hexadecimal numbers from 00 to FF; e.g. "032FE6" equals three 8-bit characters that in decimals are 3, 47 and 230; no conversions of the original ME character set shall be done.
- "IRA" International reference alphabet (ITU-T T.50)
- "PCCP437" PC character set Code Page 437
- "PCDN" PC Danish/Norwegian character set
- "8859-1" ISO 8859 Latin 1 character set

5.3.6 +WS46 Select wireless network

	Command	Response
Set	+WS46=[12]	
Read	+WS46?	12
Test	+WS46=?	(12)

The +WS46 command can be used to set and query a selected or supported wireless network. Only the value 12 'GSM digital cellular' is supported.

6 CALL CONTROL COMMANDS

6.1 V.25ter

6.1.1 D Dial

	Command	Possible verbose result codes (V1)	Numeri c (V0)	Description
Execute	D<dial-string>	BLACKLISTED	14	Call to the number is forbidden until manual reset
		BUSY	7	Called party is busy
		CONNECT	1	Data/fax call established; rate 300 bps (or X forbids rate display)
		CARRIER	16	
		CONNECT 1200	5	Data/fax call established; rate 1200 bps
		CONNECT 2400	10	Data/fax call established; rate 2400 bps
		CONNECT 4800	11	Data/fax call established; rate 4800 bps
		CONNECT 9600	12	Data/fax call established; rate 9600 bps
		CONNECT 14400	17	Data call established; rate 14400 bps
		CONNECT 19200	18	Data call established; rate 19200 bps
		CONNECT 28800	19	Data call established; rate 28800 bps
		CONNECT 38400	20	Data call established; rate 38400 bps
		DELAYED	13	Call to the number is temporarily forbidden
		ERROR	4	Command cannot be actioned
		NO ANSWER	8	Called party does not answer
		NO CARRIER	3	Call could not be established
	OK	0	Command aborted or voice call started with semicolon character	

The original description of the D command is specified in the V.25ter standard, but the implementation is according to the modifications specified in GSM 07.07. Before one of the above codes can be returned, some of the following may precede: +CSSI, +COLP, +CR (or CARRIER), +DR, or +ILRR (in that order). The dial command is also used to control alternating mode calls (see GSM 07.07 section 6.6 and annexes E and F).

NOTE: The +VTS command or comma modifier (i.e. "ATD,1234"; in this case the first comma does not cause a pause) can be used to send DTMF digits.

<dial-string> characters	Values	Description
V.25ter dialling digits	0123456789+##*	Accepted as valid digits (* and # can only be in the beginning)
	ABCD	cause ERROR
V.25ter modifiers	,	in case of a voice call: originate call to the number preceding a comma, wait for a remote answer, pause for a length specified with the S8 register, and send numbers after comma as DTMF digits; further commas cause a pause specified with S8 register (all commas are ignored in case of data call)
	T P ! W @	Accepted but ignored
V.25ter semicolon	;	voice call originating (must be the last character of command line)
GSM 07.07 modifiers	>	direct dialling from the phonebook (must be the first char after D) (see next table)
	i	allow calling line id presentation for this call
	l	restrict calling line id presentation for this call
	G	control CUG information for this call; use +CCUG values
De facto	L	re-dial to the number last dialled

NOTE: l is the only case-sensitive dial string character.

Direct dialling command	Description	+cme error
D>mem<n>[i/l][G][:]	Originate call to the phone number found in the location <n> in a specific memory <i>mem</i> , which is one of the two letter memory abbreviations as returned by +CPBS=? (without double quotes); the location range can be queried with +CPBR=?; note that in case of a SIM ADN memory (SM), D>SIM<n> shall also be accepted (due to inconsistency in 07.07)	X
D><n>[i/l][G][:]	Originate call to the phone number in memory location <n>; the memory selected with +CPBS is used	X

6.1.2 T Select tone dialling

	Command
Execute	T

The T command is ignored. The implementation is according to GSM 07.07 section 6.18.

6.1.3 P Select pulse dialling

	Command
Execute	P

The P command is ignored. The implementation is according to GSM 07.07 section 6.18.

6.1.4 A Answer response

	Command	Possible verbose result codes (V1)	Numeric (V0)	Description
Execute	A	CONNECT	1	Data/fax call established; rate 300 bps (or X forbids rate display)
		CONNECT 1200	5	Data / fax call established; rate 1200 bps
		CONNECT 2400	10	Data / fax call established; rate 2400 bps
		CONNECT 4800	11	Data / fax call established; rate 4800 bps
		CONNECT 9600	12	Data / fax call established; rate 9600 bps
		CONNECT 14400	17	Data call established; rate 14400 bps
		CONNECT 19200	18	Data call established; rate 19200 bps
		CONNECT 28800	19	Data call established; rate 28800 bps
		CONNECT 38400	20	Data call established; rate 38400 bps
		CONNECT 48000	21	Data call established; rate 48000 bps
		CONNECT 56000	22	Data call established; rate 56000 bps
		ERROR	4	Command cannot be actioned
		CARRIER	16	Call will be established
		NO CARRIER	3	Call could not be established
OK	0	Command aborted		

A command instructs the Nokia 22 to immediately connect to the line and to start the phone call. Any additional commands that appear after A on the same command line are ignored.

All the result codes are not in V.25ter. Before one of the above codes can be returned, some of the following may precede: +CR (or CARRIER), +DR, or +ILRR (in that order). The answer command is also used to control alternating mode calls (see GSM 07.07 section 6.6).

6.1.5 H Hook control

	Command	Description
Execute	H[0]	hang-up all calls (except possible waiting call) if only single mode calls are in progress, or switch to voice mode if alternate mode call is active

The implementation is according to GSM 07.07 section 6.18.

6.1.6 O Return to online data state

	Command	Possible verbose result codes (V1)	Numeri c (V0)	Description
Execute	O	CONNECT	1	Data/fax call established; rate 300 bps (or X forbids rate display)
		CONNECT 1200	5	Data / fax call established; rate 1200 bps
		CONNECT 2400	10	Data / fax call established; rate 2400 bps
		CONNECT 4800	11	Data / fax call established; rate 4800 bps
		CONNECT 9600	12	Data / fax call established; rate 9600 bps
		CONNECT 14400	17	Data call established; rate 14400 bps
		CONNECT 19200	18	Data call established; rate 19200 bps
		CONNECT 28800	19	Data call established; rate 28800 bps
		CONNECT 38400	20	Data call established; rate 38400 bps
		ERROR	4	Command cannot be actioned
		CARRIER	16	Call will be established
		NO CARRIER	3	Call could not be established
		OK	0	Command aborted

The O command returns the Nokia 22 to the online data state from the online command mode. The implementation is according to GSM 07.07 section 6.18.

6.1.7 S0 Automatic answer

	Command	Response	<n> values
Set	S0=<n>		0..255 (default 0)
Read	S0?	<n>	000..255

The S0 command sets the number of rings (RING or +CRING result codes) to wait before answering automatically. 0 disables auto answering.

6.1.8 S6 Pause before blind dialling

	Command	Response	<n> values
Set	S6=<n>		2..10
Read	S6?	002	002

The S6 command is ignored. The implementation is according to GSM 07.07 section 6.18.

6.1.9 S7 Connection completion time-out

	Command	Response	<n> values
Set	S7=<n>		0..255 (default 60)
Read	S7?	<n>	000..255

The S7 command sets the number of seconds to wait for the completion of call answering or originating procedure before giving up and disconnecting. The implementation is according to GSM 07.07 section 6.18.

6.1.10 S8 Comma dial modifier time

	Command	Response	<n> values
Set	S8=<n>		0..255 (default 2)
Read	S8?	<n>	000..255

The S8 command specifies the time in seconds that the DCE shall pause during the signalling of call addressing information to the network (dialling) when a “,” (comma) dial modifier is encountered in a dial string of the D command. The implementation is according to GSM 07.07 section 6.18.

6.1.11 S10 Automatic disconnect delay

	Command	Response	<n> values
Set	S10=<n>		0..255 (default 100)
Read	S10?	<n>	000..255

The S10 command sets the time in tenths of a second that the Nokia 22 will remain connected to the line (off-hook) after it has indicated the absence of the received line signal. If the received line signal is detected before the time specified in the S10 expires, the Nokia 22 remains connected to the line and the call continues. The implementation is according to GSM 07.07 section 6.18.

6.1.12 L Monitor speaker loudness

	Command
Execute	L[0]..L3

The L command is ignored. The implementation is according to GSM 07.07 section 6.18.

6.1.13 M Monitor speaker mode

	Command
Execute	M[0]..M2

The M command is ignored. The implementation is according to GSM 07.07 section 6.18.

6.1.14 +DS Data compression

	Command	Response	Default
Set	+DS=<dir>,<neg>,<P1>,<P2>		0,0,2048,20
Read	+DS?	+DS: <dir>,<neg>,<P1>,<P2>	
Test	+DS=?	+DS: (0-3),(0,1),(512-2048),(6-32)	

The +DS command controls the V.42 *bis* data compression function.

NOTE: The V.42 *bis* data compression must be supported by the network.

Defined values

"dir" The desired direction(s) of the operation of the data compression function; from the DTE's point of view:

- 0 Negotiated ... no compression
- 1 Transmit only
- 2 Receive only
- 3 Both directions, accept any direction

"neg" specifies whether the DCE should continue to operate if the desired result is not obtained:

- 0 Do not disconnect if Rec. V.42 bis is not negotiated by the remote DCE as specified in <dir>
 - 1 Disconnect if Rec. V.42 bis is not negotiated by the remote DCE as specified in <dir>
- "P1" the maximum number of dictionary entries which should be negotiated
 "P2" the maximum string length to be negotiated

6.1.15 +DR Data compression reporting

	Command	Response	Default
Set	+DR=<mode>		0
Read	+DR?	+DR: <mode>	
Test	+DR=?	+DR: (0,1)	

The +DR command controls the presentation of the +DR intermediate result code.

Defined values

<mode> data compression reporting:

- 0 disabled
- 1 enabled, i.e. + DR result code transmitted

6.2 De facto

6.2.1 B CCITT/Bell mode

	Command
Execute	B[0]..B1

The B command is ignored.

6.2.2 S1 Ring count

	Command	Response	<n> values
Read	S1?	<n>	000..255

The S1 command returns the number of rings (RING or +CRING result codes) counted after the last MT call setup.

6.2.3 S2 Escape code character

	Command	Response	<n> values
Set	S2=<n>		0..127 (default 43)
Read	S2?	<n>	000..127

The S2 command specifies the character to be used in the escape sequence. The default character is a plus sign. See also the +++ Escape command.

6.2.4 S12 Escape guard time

	Command	Response	<n> values
Set	S12=<n>		0..255 (default 50)
Read	S12?	<n>	000..255

The S12 command sets the guard time before and after the escape sequence. The value is in fiftieths of a second (default is one second). See also the +++ Escape command.

6.2.5 +++ Escape

During the online data state, it is possible to enter the online command state by giving three same characters (defined by S2register; default is '+') in a sequence. Before and after the sequence, there must be a pause of at least the time defined by the S12 register. By setting S12 to zero, an escape sequence detection can be disabled.

6.3 GSM 07.07

6.3.1 +CSTA Select type of address

	Command	Response	Default
Set	+CSTA=<type>		129
Read	+CSTA?	+CSTA: <type>	
Test	+CSTA=?	+CSTA: (129, 145)	

The +CSTA command selects the type of number according to the GSM specifications. The dial command D always uses this setting, except for the case when the dial string includes the international access code character (+). In this case, the type of address sent to the network defaults to 145.

Defined values

<type> type of number, refer to GSM 04.08 10.5.4.7:

129 unknown/telephony
 145 international/telephony

6.3.2 +CMOD Call mode

	Command	Response	Default
Set	+CMOD=<mode>		0
Read	+CMOD?	+CMOD: <mode>	
Test	+CMOD=?	+CMOD: (0-3)	

The +CMOD command selects the call mode of the further dialling commands (D) or for the next answering command (A). The mode can be either single or alternating. When the single mode is selected, the call originating and hang-up procedures are similar to the procedures specified in the ITU-T Recommendations V.25ter, T.31 and T.32. In the GSM system, voice calls can be followed by alternating voice/data and alternating voice/fax calls.

NOTE: The +CMOD shall be set to zero after a successfully completed alternating mode call. It shall be set to zero also after a failed answering. The power-up, factory (&F) and user resets (Z) shall also set the value to zero. This reduces the possibility of accidentally originating or answering alternating mode calls.

NOTE: Alternating call answering operations from an external UI may change the +CMOD values.

Defined values

<mode>:

0 single mode
 1 alternating voice/fax (teleservice 61)
 2 alternating voice/data (bearer service 61)
 3 voice followed by data (bearer service 81)

6.3.3 +CHUP Hang-up call

	Command
Execute	+CHUP
Test	+CHUP=?

The +CHUP is an assured procedure to terminate an alternating mode call.

6.3.4 Mute control +CMUT

	Command	Response
Set	+CMUT=<n>	+CME ERROR: <err>
Read	+CMUT?	+CMUT: <n> +CME ERROR: <err>
Test	+CMUT=?	+CMUT: (list of supported <n>s)

Description

This command is used to enable and disable the uplink voice muting during a voice call. The test command returns the supported values as a compound value.

Defined values

0	mute off
1	mute on

6.3.5 Loudspeaker volume level +CLVL

	Command	Response	Default
Set	+CLVL=<level>		0,0,1
Read	+CLVL?	+CLVL: <level>	
Test	+CLVL=?	+CLVL: (list of supported <level>s)	

Description

This command is used to select the volume of the internal loudspeaker of the ME. The test command returns the supported values as a compound value.

Defined values

<level>: integer type value with manufacturer specific range (smallest value represents the lowest sound level)

6.3.6 +CBST Select bearer service type

	Command	Response	Default
Set	+CBST=<speed>, <name>,<ce>		0,0,1
Read	+CBST?	+CBST: <speed>,<name>,<ce>	
Test	+CBST=?	+CBST: (0-7,12,14-16,34,36,38,39,43,47-51,65,66,68,70,71,75, ,79-81), (0,2),(0-3)	

The +CBST command selects the bearer service with a data rate and the connection element to be used when data calls are originated. The values may also be used during a mobile terminated data call setup, especially in the case of single numbering scheme calls (refer +CSNS).

Defined values

<speed>:

- 0 autobauding (automatic selection of the speed; this setting is possible in case of a 3.1 kHz modem and non-transparent service)
- 1 300 bps (V.21)
- 2 1200 bps (V.22)
- 3 1200/75 bps (V.23)
- 4 2400 bps (V.22bis)
- 5 2400 bps (V.26ter)
- 6 4800 bps (V.32)
- 7 9600 bps (V.32)
- 12 9600 bps (V.34)
- 14 14400 bps (V.34)
- 15 19200 bps (V.34)
- 16 28800 bps (V.34)
- 34 1200 bps (V.120)
- 36 2400 bps (V.120)
- 38 4800 bps (V.120)
- 39 9600 bps (V.120)
- 43 14400 bps (V.120)
- 47 19200 bps (V.120)
- 48 28800 bps (V.120)
- 49 38400 bps (V.120)
- 50 48000 bps (V.120)
- 51 56000 bps (V.120)
- 65 300 bps (V.110)
- 66 1200 bps (V.110)
- 68 2400 bps (V.110 or X.31 flag stuffing)
- 70 4800 bps (V.110 or X.31 flag stuffing)
- 71 9600 bps (V.110 or X.31 flag stuffing)
- 75 14400 bps (V.110 or X.31 flag stuffing)
- 79 19200 bps (V.110 or X.31 flag stuffing)
- 80 28800 bps (V.110 or X.31 flag stuffing)

<name>:

- 0 data circuit asynchronous (UDI or 3.1 kHz modem)
- 2 PAD Access (asynchronous) (UDI)

<ce>:

- 0 transparent
- 1 non-transparent
- 2 both, transparent preferred
- 3 both, non-transparent preferred

6.3.7 +CRLP Radio link protocol

	Command	Response	Default
Set	+CRLP=<iws>,<mws>,<T1>,<N2>[,<ver>,<T4>]		61,61,48,6
Read	+CRLP?	+CRLP: <iws>,<mws>,<T1>,<N2><CR><LF>	
Test	+CRLP=?	+CRLP: (0-61),(0-61),(39-255),(1-255)<CR><LF>	

The +CRLP command sets the used radio link protocol (RLP) parameters when non-transparent data calls are originated.

The read command returns the current settings.

The test command returns the values supported by the Nokia 22 as a compound value.

Defined values

- <ver> : RLP version number in integer format; when version indication is not present, it shall equal 0
- <iws> Inter Working Function (IWF) to MS window size
- <mws> MS to IWF window size
- <T1> acknowledgement timer in units of 10 ms
- <N2> retransmission attempts
- <T4>: re-sequencing period in units of 10 ms

6.3.8 +CR Service reporting control

	Command	Response	Default
Set	+CR=<mode>		0
Read	+CR?	+CR: <mode>	
Test	+CR=?	+CR: (0,1)	

The +CR command controls the returning of the intermediate result code +CR: <serv>. If enabled, the intermediate result code is transmitted during connect negotiation when the Nokia 22 has determined the speed and quality of service that will be used, and before any error control or data compression reports are transmitted or any final result code (e.g. CONNECT) is transmitted.

Defined values

<mode>:

- 0 disables reporting
- 1 enables reporting

<serv>:

REL ASYNC asynchronous non-transparent

6.3.9 +CEER Extended error report

	Command	Response
Execute	+CEER	+CEER: <report>
Test	+CEER=?	

The +CEER command returns the reason for the last call setup or in-call modification failure, or the reason for the last last call release. <report> is the textual representation of the network cause value as listed in GSM 04.08 annex H.

6.3.10 +CRC Cellular result codes

	Command	Response	Default
Set	+CRC=<mode>		0
Read	+CRC?	+CRC: <mode>	
Test	+CRC=?	+CRC: (0,1)	

The +CRC command controls whether the extended format of an incoming call indication is used. When enabled, an incoming call is indicated with the unsolicited result code +CRING: <type> instead of the normal RING.

Defined values

<mode>:

- 0 disables extended format
- 1 enables extended format

<type>:

- FAX facsimile (TS 62)
- VOICE normal voice (TS 11)
- VOICE/REL ASYNC voice followed by data (BS 81)
- ASYNC normal data (BS 81)
- REL ASYNC normal data (BS 81)
- ALT VOICE/REL ASYNC alternating voice/data, voice first (BS 61)
- ALT REL ASYNC/VOICE alternating voice/data, data first (BS 61)
- ALT VOICE/FAX alternating voice/fax, voice first (TS 61)
- ALT FAX/VOICE alternating voice/fax, fax first (TS 61)

6.3.11 +CHSR Current call parameters reporting

	Command	Response	Default
Set	+CHSR=<mode>		1
Read	+CHSR?	+CHSR: <mode>	
Test	+CHSR=?	+CHSR: (0,1)	

When the CHSR=1 is set, the current HSCSD configuration is written to the terminal window every time the HSCSD configuration has changed or a new HSCSD call has been initiated. To disable the feature, key in at+chsr=0.

6.3.12 +CSNS Single numbering scheme

	Command	Response	Default
Set	+CSNS=<mode>		0
Read	+CSNS?	+CSNS: <mode>	
Test	+CSNS=?	+CSNS: (0-7)	

The +CSNS command selects the bearer or teleservice to be used when a mobile terminated single numbering scheme call is established, i.e. when a call without bearer capability element is received.

The parameter values set with the +CBST command shall be used when <mode> equals a data service. If the +CBST parameter is set to a value that is not applicable to single numbering calls, the parameter shall be mapped to the closest valid value.

Defined values

<mode>:

- 0 voice
- 1 alternating voice/fax, voice first (TS 61)
- 2 fax (TS 62)
- 3 alternating voice/data, voice first (BS 61)
- 4 data
- 5 alternating voice/fax, fax first (TS 61)
- 6 alternating voice/data, data first (BS 61)
- 7 voice followed by data (BS 81)

6.3.13 +CHSD HSCSD device parameters

	Command	Response	+cme error
execute	+CHSD	+CHSD: <mclass>, <maxRx>, <maxTx>, <sum>, <codings>	x
test	+CHSD=?		

Parameters:

- <mclass>: integer type; multislot class
 - <maxRx>: integer type; the maximum number of receive timeslots that the ME can use
 - <maxTx>: integer type; the maximum number of transmit timeslots that the ME can use
 - <sum>: integer type; the total number of receive and transmit timeslots that the ME can use at the same time (per TDMA frame). The following applies in a HSCSD call: 1 £ (receive slots) + (transmit slots) £ <sum>
 - <codings> a sum of integers each representing a supported channel coding
- 4 9.6k full rate data traffic channel
 - 8 14.4k full rate data traffic channel
 - 12 both 9.6k and 14.4k supported

6.3.14 +CHSN Parameter command syntax

	Command	Response	+cme error
execute	+CHSN=[<wAiur>[, <wRx>[, <topRx>[, <codings>]]]]	+CHSN: <wAiur>, <wRx>, <topRx>, <codings>	x
test	+CHSN=?	+CHSN: (1-6), (1-3), (0-3), (4, 8)	

Description

The set command controls parameters for non-transparent HSCSD calls. Changing <topRx> or <codings> value during a call does not affect the current call. Changing <wAiur> or <wRx> affects the current call only if <topRx> was non-zero when a call was established.

Defined values

<wAiur>: integer type; wanted air interface user rate. The default value 0 indicates that the TA shall calculate a proper value from the currently selected fixed network user rate (<speed> subparameter from +CBST command), <codings>, and <wRx> (or <maxRx> from +CHSD command if <wRx>=0). Other values:

- 1 9600 bps
- 2 14400 bps
- 3 19200 bps
- 4 28800 bps
- 6 43200 bps

<wRx>: integer type; wanted amount of receive timeslots. The default value 0 indicates that the TA shall calculate a proper value from the currently selected <wAiur> and <codings>

<topRx>: integer type; top value for <wRx> that the user is going to request during the next established non-transparent HSCSD call. The default value 0 indicates that the user is not going to change <wAiur>/<wRx> during the next call

<codings>: a sum of integers each representing a channel coding that is accepted for non-transparent HSCSD calls. The default value 0 indicates that all the supported codings are accepted (refer +CHSD command for other values)

<codings>: is a sum of integers each representing a supported channel coding:

- 4 9.6k full rate data traffic channel
- 8 14.4k full rate data traffic channel
- 12 Both 9.6k and 14.4k supported

<maxAiur>: integer type; the maximum value for <wAiur> (assuming that all supported channel codings are accepted and the maximum number of timeslots is used)

<modify>:

- 0 <wAiur>/<wRx> modification during call is not supported (<topRx> accepts only 0)
- 1 <wAiur>/<wRx> modification during call is supported by ME/TA

NOTE! The non-transparent/transparent data service shall be selected by the at+cbst command.

6.3.15 +CHSC Current call parameters

	Command	response
execute	+CHSC	+CHSC: <rx>,<tx>,<aiur>,<coding>
test	+CHSC=?	

Parameters:

<rx>: integer type; the number of receive timeslots currently in use

<tx>: integer type; the number of transmit timeslots currently in use

<aiur>: integer type; the current air interface user rate (in case of a transparent service this equals fixed network user rate) (Refer to the +CHSN command for the possible values.)

<coding>: current channel coding (Refer to the +CHSD command for the possible values.)
+CVHU voice hang-up control

6.3.16 +CVHU Voice Hang Up Control

	Command	response	default
set	+CVHU=<mode>		0
read	+CVHU?	+CVHU: <mode>	
test	+CVHU=?	+CVHU: (0-2)	

By default, NMP products should ignore the DTR drop, but disconnect on the ATH during a call that is in the voice mode. (GSM 07.07 section 6.).

7 NETWORK SERVICE COMMANDS (GSM 07.07)

7.1 +CNUM Subscriber number

	Command	Response	+cme error
Execute	+CNUM	+CNUM: [<alpha1>],<number1>,<type1> [<CR><LF>+CNUM: [<alpha2>],<number2>,<type2> [...]]	x
Test	+CNUM=?		

The +CNUM command returns the MSISDNs related to the subscriber. This information can be stored in the SIM. If the subscriber has different MSISDNs for different services, each MSISDN is returned on a different line.

Defined values

<alpha> optional alphanumeric string associated with <number>

<number> string type phone number of a format specified by <type>

<type> type of address octet in integer format (refer GSM 04.08 10.5.4.7):

145	international/telephony
129	unknown/telephony

7.2 +CREG Network registration

	Command	Response	Default	+cme error
Set	+CREG=<n>		0	
Read	+CREG?	+CREG: <n>,<stat>[,<lac>,<ci>]		x
Test	+CREG=?	+CREG: (0-2)		

The +CREG command controls the presentation of the unsolicited result code +CREG: <stat> when <n>=1 and the ME network registration status changes, or the code +CREG: <stat>[,<lac>,<ci>] when <n>=2 and the network cell changes.

The read command returns the status of a result code presentation and an integer <stat> which shows whether the network has currently indicated the registration of the ME. The location information elements <lac> and <ci> are returned only when <n>=2 and the ME is registered in the network.

Defined values

<n>:

- 0 disable network registration unsolicited result code
- 1 enable network registration unsolicited result code +CREG: <stat>
- 2 enable network registration and location information unsolicited result code +CREG: <stat>[,<lac>,<ci>]

<stat>:

- 0 not registered, the ME is not currently searching for a new operator to register to
- 1 registered, home network
- 2 not registered, but ME is currently searching for a new operator to register to
- 3 registration denied
- 4 unknown
- 5 registered, roaming

<lac> string type; a two byte location area code in hexadecimal format (e.g. "00C3" equals 193 in decimal)

<ci>: string type; a two byte cell ID in hexadecimal format

7.3 +COPS Operator selection

	Command	Response	Default	+cme error
Set	+COPS=<mode>,<format>,<oper>		[0,2]	x
Read	+COPS?	+COPS: <mode>[,<format>,<oper>]		x
Test	+COPS=?	+COPS: [(<stat>,,,<oper>)[,...]],(0,1),(2)		x

The +COPS command forces an attempt to select and register the GSM network operator. <mode> is used to select whether the selection is automatically carried out by the Nokia 22 or whether it is forced by this command to the operator <oper>, given in numeric 2 <format>. The selected operator name format shall also apply to the further read commands (+COPS?).

The read command returns the current mode and the currently selected operator. If no operator is selected, <format> and <oper> are omitted.

The test command returns a list of quadruplets, each representing an operator that is present in the network. A quadruplet consists of an integer indicating the availability of the operator <stat> and a numeric representation of the operator. The list of operators shall be in the following order: home network, networks referenced in SIM and other networks.

After the operator list is returned, the Nokia 22 returns lists of the supported <mode>s and <format>. These lists shall be delimited from the operator list with two commas.

Defined values

<mode>:

- 0 automatic (<oper> field is ignored)
- 1 manual (<oper> field shall be present)

<format>:

2 numeric <oper>

<oper> The numeric format is the GSM Location Area Identification number (refer GSM 04.08 10.5.1.3) which consists of a three BCD digit country code coded as in ITU-T E.212 Annex A, plus a two BCD digit network code, which is administration specific; returned <oper> shall not be in Binary Coded Decimal (BCD) format, but in IRA characters converted from BCD; hence the number has the following structure: (country code digit 3)(country code digit 2)(country code digit 1)(network code digit 2)(network code digit 1)

<stat>:

0 unknown
 1 available
 2 current
 3 forbidden

7.4 +CLCK Facility lock

	Command	Response	Default	+cme error
Execute	+CLCK=<fac>,<mode>,<passwd>,<class>	when <mode>=2: +CLCK: <status>[,<class1> [<CR><LF>+CLCK: <status>,<class2> [...]]	[,7]	x
Test	+CLCK=?	+CLCK: ("PS","SC","AO","OI","OX", "AI","IR","AB","AG","AC","FD")		

The +CLCK command enables and disables or queries the state of SIM/ME security features (PIN or security code query or fixed dialling feature) or call barring supplementary services. The <fac> values "AB", "AG" and "AC" are only applicable for <mode>=0. Only security code levels 'phone' and 'none' can be handled with this command. If the 'memory' level is set and the status is queried (+CLCK="PS",2), the AT interface shall indicate 'not active' (+CLCK: 0). When the SS status request response coming from the network indicates that the SS is active for a specific data bearer services (e.g. 'circuit async'), the AT interface shall only indicate 'data' (<class>=2) ('not active' case is displayed only when the SS is not active to any service; i.e. +CLCK: 0,7).

The test command returns facility values supported by the Nokia 22 as a compound value.

Defined values

<fac>:

"PS" PH-SIM (lock Phone to SIM card) (The ME asks for a password when an other SIM card than the current SIM card is inserted; the ME may remember certain amount of previously used cards and, therefore, it does not necessarily ask for a password when a previously used cards is inserted)

"SC"	SIM (lock SIM card) (SIM asks for a password in an ME power-up and when this lock command is issued)
"AO"	BAOC (Barr All Outgoing Calls) (refer ti GSM02.88, clause 1)
"OI"	BOIC (Barr Outgoing International Calls) (refer to GSM 02.88, clause 1)
"OX"	BOIC-exHC (Barr Outgoing International Calls except for Home Country) (refer to GSM 02.88, clause 1)
"AI"	BAIC (Barr All Incoming Calls) (refer to GSM 02.88, clause 2)
"IR"	BIC-Roam (Barr Incoming Calls when Roaming outside the home country) (refer to GSM 02.88, clause 2)
"AB"	All Barring services (refer to GSM 02.30) (applicable only for <mode>=0)
"AG"	All outgoing barring services (refer to GSM 02.30) (applicable only for <mode>=0)
"AC"	All incoming barring services (refer to GSM 02.30) (applicable only for <mode>=0)
"FD"	SIM fixed dialling memory feature (if the PIN2 authentication is not done during the current session, the PIN2 is required as <passwd>)
<mode>:	
0	unlock
1	lock
2	query status
<status>:	
0	not active
1	active
<passwd>	string type; shall be the same as the password specified for the facility from the Nokia 22 user interface or with the Change Password +CPWD command
<classx>	is a sum of integers each representing a class of information (the default value 7 equals all classes):
1	voice (telephony)
2	data (usually refers to all bearer services; with <mode>=2 this may only refer to some bearer service)
4	fax (facsimile services)

7.5 +CPWD Change password

	Command	Response	+cme error
Execute	+CPWD=<fac>,<oldpwd>,<newpwd>		X
Test	+CPWD=?	+CPWD: ("PS",5),("SC",4),("AB",4),("P2",4)	

The +CPWD command sets a new password for the facility lock function defined by the Facility Lock +CLCK command. Note that the target lock has to be in <mode>=1.

The test command returns a list of pairs that present the available facilities and the maximum length of their password.

Defined values

<fac>:

"PS" PH-SIM lock Phone to SIM card
 "SC" SIM lock SIM card
 "AB" All Barring services
 "P2" SIM PIN2

<oldpwd>, <newpwd> string type; <oldpwd> shall be the same as the password specified for the facility from the ME user interface or using the Change Password +CPWD command. <newpwd> is the new password

7.6 +CLIP Calling line identification presentation

	Command	Response	Default
Set	+CLIP=<n>		0
Read	+CLIP?	+CLIP: <n>,<m>	
Test	+CLIP=?	+CLIP: (0,1)	

The +CLIP command refers to the GSM supplementary service CLIP (Calling Line Identification Presentation) that enables a called subscriber to get the calling line identity (CLI) of the calling party when receiving a mobile terminated call. The +CLIP command enables or disables the presentation of the CLI. It has no effect on the execution of the CLIP supplementary service in the network.

When the presentation of the CLI is enabled (and the calling subscriber allows it), +CLIP: number>, <type> response is returned after every RING (or +CRING: <type>; refer to "Cellular result codes +CRC") result code.

The read command gives the status of <n> and triggers an interrogation of the provision status of the CLIP service according GSM 02.81 (given in <m>). The test command returns the values supported by the Nokia 22 as a compound value.

Defined values

<n> parameter sets/shows the result code presentation status in the Nokia 22:

- 0 disable
- 1 enable

<m> parameter shows the subscriber CLIP service status in the network:

- 0 CLIP not provisioned
- 1 CLIP provisioned
- 2 unknown (e.g. no network, etc.)

<number> string type phone number of a format specified by <type>

<type> type of address octet in integer format (refer to GSM 04.08 subclause 10.5.4.7):

- 129 unknown/telephony
- 145 international/telephony

7.7 +CLIR Calling line identification restriction

	Command	Response	Default
Set	+CLIR=<n>		0
Read	+CLIR?	+CLIR: <n>,<m>	
Test	+CLIR=?	+CLIR: (0-2)	

The +CLIR command refers to the CLIR-service according to GSM 02.81 that allows a calling subscriber to enable or disable the presentation of the CLI to the called party when originating a call.

The set command overrides the CLIR subscription when the temporary mode is provisioned as a default adjustment for all the following outgoing calls. This adjustment can be revoked by using the opposite command. If this command is used by a subscriber without a provision of CLIR in the permanent mode, the network will act according GSM 02.81.

The read command gives the default adjustment for all the outgoing calls (given in <n>) and triggers an interrogation of the provision status of the CLIR service (given in <m>).

The test command returns the supported values.

Defined values

<n> sets the adjustment for outgoing calls:

- 0 the presentation indicator is used according to the subscription of the CLIR service

- 1 CLIR invocation
- 2 CLIR suppression

<m> shows the subscriber CLIR service status in the network:

- 0 CLIR not provisioned
- 1 CLIR provisioned in permanent mode
- 2 unknown (e.g. no network, etc.)
- 3 CLIR temporary mode presentation restricted
- 4 CLIR temporary mode presentation allowed

7.8 +COLP Connected line identification presentation

	Command	Response	Default
Set	+COLP=<n>		0
Read	+COLP?	+COLP: <n>,<m>	
Test	+COLP=?	+COLP: (0,1)	

The +COLP command refers to the GSM supplementary service COLP (Connected Line Identification Presentation) that enables a calling subscriber to get the connected line identity (COL) of the called party after setting up a mobile originated call. The command enables or disables the presentation of the COL. It has no effect on the execution of the COLR supplementary service in the network.

When enabled (and called subscriber allows), the +COLP: <number>,<type> intermediate result code is returned before any +CR or V.25ter responses.

The read command gives the status of <n> and triggers an interrogation of the provision status of the COLP service according to GSM 02.81 (given in <m>).

The test command returns the supported values.

Defined values

<n> sets/shows the result code presentation status in the Nokia 22:

- 0 disable
- 1 enable

<m> shows the subscriber COLP service status in the network:

- 0 COLP not provisioned
- 1 COLP provisioned
- 2 unknown (e.g. no network, etc.)

<number> string type phone number of a format specified by <type>

<type> type of address octet in integer format (refer GSM 04.08 subclause 10.5.4.7):

- 129 unknown/telephony
- 145 international/telephony

7.9 +CCWA Call waiting

	Command	Response	Default	+cme error
Set	+CCWA=<n>,<mode>,<class>	when <mode>=2: +CCWA: <status>,<class1> [<CR><LF>+CCWA: <status>,<class2> [...]]	0[,7]	x
Read	+CCWA?	+CCWA: <n>		
Test	+CCWA=?	+CCWA: (0,1)		

The +CCWA command allows the controlling of the Call Waiting supplementary service according to GSM 02.83. Activation, deactivation and status query are supported. When querying the status of a network service (<mode>=2), the response line for the 'not active' case (<status>=0) should be returned only if the service is not active for any <class>. The parameter <n> is used to disable and enable the presentation of an unsolicited result code.

+CCWA: <number>,<type>,<class> when the call waiting service is enabled.

The interaction of this command with other commands based on other GSM supplementary service is described in the GSM standard.

The test command returns the supported values.

Defined values

<n> sets/shows the result code presentation status:

0	disable
1	enable

<mode> when not given, the network is not interrogated:

0	disable
1	enable
2	query status

<classx> is a sum of integers each representing a class of information (the default value 7 equals all classes):

1	voice (telephony)
2	data (usually refers to all bearer services; with <mode>=2 this may only refer to some bearer services)
4	fax (facsimile services)

<status>:

0	not active
1	active

<number> string type phone number of a calling address in the format specified by <type>

<type> type of address octet in integer format (refer GSM 04.08 10.5.4.7):

129 unknown/telephony
 145 international/telephony

7.10 +CUSD Unstructured supplementary service data

	Command	Response	Default	+cme error
Set	+CUSD=<n>,<str>,<dc>	+CUSD: <m>[,<str>,<dc>]	0[,,0]	x
Read	+CUSD?	+CUSD: <n>		
Test	+CUSD=?	+CUSD: (0,1)		

The +CUSD command allows the controlling of the Unstructured Supplementary Service Data (USSD) according to GSM 02.90. Both network and mobile initiated operations are supported. The parameter <n> is used to disable and enable the presentation of an unsolicited result code (network initiated operation) +CUSD: <m>,<str>,<dc>.

When <str> is given, a mobile initiated USSD-string or a response USSD-string to a network initiated operation is sent to the network. In the case of a successful mobile initiated operation, the response USSD-string coming from the network is returned before the final result code.

The test command returns the supported values.

Defined values

<n> sets/shows the result code presentation status:

0 disable
 1 enable

<str> string type USSD-string (when <str> parameter is not given, the network is not interrogated):

- if <dc> indicates that the GSM 03.38 default alphabet is used:

- if the TE character set is not "HEX" (refer to the Select TE Character Set +CSCS command): the Nokia 22 converts GSM alphabet into the current TE character set according to the rules of GSM 07.05, Annex A

- if the TE character set is "HEX": the Nokia 22 converts each 7-bit character of the GSM alphabet into two IRA character long hexadecimal numbers (e.g. character Π (GSM 23) is presented as 17 (IRA 49 and 55))

- if <dc> indicates that a 8-bit data coding scheme is used: the Nokia 22 converts each 8-bit octet into two IRA character long hexadecimal numbers (e.g. octet with integer value 42 is presented to the TE as two characters 2A (IRA 50 and 65))

<dc> GSM 03.38 Cell Broadcast Data Coding Scheme in integer format (default 0)

<m>:

- 0 no further user action required (network initiated USSD-Notify, or no further information needed after mobile initiated operation)
- 1 further user action required (network initiated USSD-Request, or further information needed after mobile initiated operation)

7.11 +CSSN Supplementary service notifications

	Command	Response	Default
Set	+CSSN=<n>,<m>		0,0
Read	+CSSN?	+CSSN: <n>,<m>	
Test	+CSSN=?	+CSSN: (0,1),(0,1)	

The +CSSN command controls the presentation of the +CSSI intermediate result code and the +CSSU unsolicited result code.

The test command returns the supported values.

Defined values

<n> sets/shows the +CSSI result code presentation status:

- 0 disable
- 1 enable

<m> sets/shows the +CSSU result code presentation status:

- 0 disable
- 1 enable

7.12 +CLCC List current calls

	Command	Response	+cme error
Execute	+CLCC	[+CLCC: <id1>,<dir>,<stat>,<mode>,<empty> [<CR><LF>+CLCC: <id2>,<dir>,<stat>,<mode>,<empty> [...]]]	x
Test	+CLCC=?		

The +CLCC command returns a list of current calls of the Nokia 22. If the command succeeds but no calls are available, no information response is sent.

Defined values

<idx> integer type call identification number as described in GSM 02.30 4.5.5.1. This number can be used in the +CHLD command operations.

<dir>:

- 0 mobile originated (MO) call
- 1 mobile terminated (MT) call

<stat> state of the call:

- 0 active
- 1 held
- 2 dialing (MO call)
- 3 alerting (MO call)
- 4 incoming (MT call)
- 5 waiting (MT call)

<mode> bearer/teleservice:

- 0 voice
- 1 data
- 2 fax
- 3 voice followed by data, voice mode
- 4 alternating voice/data, voice mode
- 5 alternating voice/fax, voice mode
- 6 voice followed by data, data mode
- 7 alternating voice/data, data mode
- 8 alternating voice/fax, fax mode
- 9 unknown

<mpty>:

- 0 call is not one of multiparty (conference) call parties
- 1 call is one of multiparty (conference) call parties

7.13 +CCUG Closed user group

	Command	Response	Default
set	+CCUG=<n>,<index>,<info>		0,0,0
read	+CCUG?	+CCUG: <n>,<index>,<info>	
test	+CCUG=?		

Parameters:

<n>:

- 0 disable CUG temporary mode
- 1 enable CUG temporary mode

<index>:

- 0...9 CUG index
- 10 no index (preferred CUG taken from subscriber data)

<info>:

- 0 no information
- 1 suppress OA
- 2 suppress preferential CUG
- 3 suppress OA and preferential CUG+CCFC call forwarding number and conditions

7.14 +CCFC Call Forwarding Number and Conditions

	Command	Response	default	+cme error
Execute	+CCFC=<reason> , <mode>,<number> , <type>,<class> , <subaddr> , <satype> , <time>	when <mode>=2: +CCFC: <status>,<class1>[,<number>,<type> [,<subaddr>,<satype>[,<time>]]] [<CR><LF>+CCFC: <status>,<class2>[,<number> ,<type>[,<subaddr>,<satype>[,<time>]]] [...]]	[, , , 129/145,7 , ,128,20]	x
Test	+CCFC=?	+CCFC: (0-5)		

This command controls call forwarding supplementary services. The <reason> values 4 and 5 are only applicable for <mode>=0. When the status request response from network indicates that the SS is active for specific data bearer services (e.g. 'circuit async'), the AT interface shall only indicate 'data' (<class>=2) (the 'not active' case is displayed only when the SS is not active to any service; i.e. +CCFC: 0,7).

Parameters:

<reason>:

- 0 unconditional
- 1 mobile busy
- 2 no reply
- 3 not reachable
- 4 all call forwarding (GSM 02.30)
- 5 all conditional call forwarding (GSM 02.30)

<mode>:

- 0 disable
- 1 enable
- 2 query status
- 3 registration
- 4 erasure

<number>: string type phone number of forwarding address in the format specified by <type>

<type>: type of address octet in integer format (GSM 04.08, subclause 10.5.4.7). The default value is 145 when the dialling string includes the international access code character "+", otherwise the default value is 129

<subaddr>: string type subaddress of the format specified by <satype>

<satype>: type of subaddress octet in integer format (GSM 04.08, subclause 10.5.4.8). The default value is 128.

<classx>: a sum of integers each representing a class of information (the default value 7 equals all classes):

- 1 voice
- 2 data
- 4 fax

also all other values below 128 are reserved

<time>: 1...30 when "no reply" is enabled or queried, gives the time in seconds to wait before a call is forwarded. The default value is 20.

<status>:
 0 not active
 1 active

7.15 +CHLD Call related to SSs

	Command	response	+cme error
Execute	+CHLD=<n>		x
test	+CHLD=?	+CHLD: (0 , 1 , 1x , 2 , 2x , 3 , 4)	

Optional. See ETSI GSM 07.07 /2/, section 7.12. Controls call hold, multiparty and explicit call transfer supplementary service operations as defined in GSM 02.30, section 4.5.5.1. A short description of <n> values: 0 = release waiting or incoming call (send 'busy' cause to network), or held calls; 1 = release active calls and accept another (waiting or held) call; 1x = release active call x; 2 = active calls on hold and accept another (waiting or held) call; 2x = active multiparty call on hold except for call x; 3 = add a held call to a multiparty call; 4 = connect a held call to an active (or MO alerting) call (locally both calls are disconnected).

7.16 +CAOC Advice of charge

	Command	response	+cme error
execute	+CAOC[=<mode>]	[+CAOC: <ccm>]	x
read	[+CAOC?]	+CAOC: <mode>	
test	+CAOC=?	[+CAOC: (0-2)]	

Optional. See ETSI GSM 07.07 /2/, section 7.15. Returns the current call meter value (in home units) from the ME.

8 ME CONTROL AND STATUS COMMANDS (GSM 07.07)

8.1 +CPWC ME power class control

	Command	Response	+cme error
execute	+CPWC=<class>, <band>	[+CAOC: <ccm>]	x
read	+CPWC?	+CPWC: <curr_class1>, <def_class1>, <band1> [, <curr_class2>, <def_class2>, <band2>[...]]	x
test	+CPWC=?	+CPWC: (0, (0,4,5)), (1, (0-2))	

This command is used to set the preferred ME power class for each supported GSM frequency band. The interaction of this setting with the selected bearer service (+CBST and HSCSD commands) is manufacturer specific (for example, selecting a multislot operation might reduce the power class automatically). If the setting fails in an ME error, the +CME ERROR: <err> is returned.

The read command returns the currently selected output power class and default output power class for each supported frequency band (as defined by the ME manufacturer). The parameter <band1> and its associated power class parameters refer to the currently used frequency band. For example, +CPWC: 2,1,1,5,4,0 in the case of a dual-band ME currently using the band GSM1800, for which the power class is currently set to 2, the default being class 1, and the currently set power class value for GSM900 is class 5, the default being class 4.

The test command returns the supported bands and their power classes. For example, +CPWC: (0,(0,4,5)),(1,(0-2)) in a case of a dual-band handheld ME.

Defined values

<class>, <curr_classn>s, <def_classn>s:

0 default (not applicable to <curr_class>s or <def_classn>s)

1... MS output power class as in GSM 05.05 [38]

<band>, <bandn>s:

0 GSM900

1 GSM1800

2 reserved for GSM1900

3

8.2 +CPAS Phone activity status

	Command	Response
Execute	+CPAS	+CPAS: <pas>
Test	+CPAS=?	+CPAS: (0,1,3,4)

The +CPAS command returns the activity status <pas> of the ME. It can be used to interrogate the ME before requesting action from the phone.

The test command returns the supported values.

Defined values

<pas>:

0	ready
1	unavailable (This value is never reported.)
3	ringing
4	call in progress

8.3 +CFUN Set phone functionality

	Command	Response	Default	+cme error
Set	+CFUN=<fun>[,0]		[0,0]	x
Read	+CFUN?	+CFUN: <fun>		x
Test	+CFUN=?	+CFUN: (0,1),(0)		

The +CFUN command selects the level of functionality <fun> of the Nokia 22. It can be used to stop the use of the Nokia 22 in a controlled manner. After <fun>=0, it is not possible to communicate with the Nokia 22, but the device has to be hardware reset to establish communication.

The test command returns supported values.

Defined values

<fun>:

0	minimum functionality
1	full functionality, this setting is ignored

8.4 +CPIN Enter PIN

	Command	Response	+cme error
Set	+CPIN=<pin>,<newpin>		x
Read	+CPIN?	+CPIN: <code>	x
Test	+CPIN=?		

The +CPIN command sends a password to the Nokia 22 that is required for the operating the Nokia 22 (SIM PIN, SIM PUK, PH-SIM PIN, etc.). Note that quotation marks must be used in this command (e.g. AT+CPIN="1234").

If the required PIN is SIM PUK or SIM PUK2, <newpin> is required. <newpin> replaces the old pin of the SIM.

The read command returns an alphanumeric string that indicates whether a password is required.

Defined values

<pin>, <newpin> string type values

<code>:

READY	ME is not pending for any password
SIM PIN	ME is waiting for a SIM PIN
SIM PUK	ME is waiting for a SIM PUK
PH-SIM PIN	ME is waiting for a phone-to-SIM card password
PH-FSIM PIN	ME is waiting for a phone-to-very first SIM card password
PH-FSIM PUK	ME is waiting for a phone-to-very first SIM card unblocking password
SIM PIN2	ME is waiting for a SIM PIN2 (it is recommended that this <code> is returned only if the last executed command resulted in a PIN2 authentication failure (i.e. +CME ERROR: 17); if the PIN2 is not entered immediately after the failure, it is recommended that the ME should not block its operation)
SIM PUK2	ME is waiting for a SIM PUK2 (it is recommended that this <code> should be returned only if the last executed command resulted in a PUK2 authentication failure (i.e. +CME ERROR: 18); if PUK2 and the new PIN2 are not entered immediately after the failure, it is recommended that the ME should not block its operation)
PH-NET PIN	ME is waiting for a network personalisation password
PH-NET PUK	ME is waiting for a network personalisation unblocking password
PH-NETSUB PIN	ME is waiting for a network subset personalisation password
PH-NETSUB PUK	ME is waiting for a network subset personalisation unblocking password
PH-SP PIN	ME is waiting for a service provider personalisation password
PH-SP PUK	ME is waiting for a service provider personalisation unblocking password
PH-CORP PIN	ME is waiting for a corporate personalisation password
PH-CORP PUK	ME is waiting for a corporate personalisation unblocking password

8.5 +CSQ Signal quality

	Command	Response	+cme error
Execute	+CSQ	+CSQ: <rssi>,99	x
Test	+CSQ=?	+CSQ: (0-31,99),(99)	

The +CSQ command returns the received signal strength indication <rssi>.

The test command returns the supported values.

Defined values

<rsssi> indicates the quality of the network coverage:

0	No network coverage
6	Nokia 22 is connected to the network
12	Satisfactory coverage
18	Good coverage
24	Excellent coverage

8.6 +CPBS Select phonebook memory storage

	Command	Response	Default	+cme error
Set	+CPBS=<storage>		"SM"	
Read	+CPBS?	+CPBS: <storage>		x
Test	+CPBS=?	+CPBS: ("ME","SM","FD","ON","EN","MC","DC","RC")		

The +CPBS command selects the phonebook memory storage <storage> that is used by the other phonebook commands.

The read command returns the currently selected memory, the number of used locations and the total number of the locations in the memory.

The test command returns the supported storages.

Defined values

<storage>:

"DC"	ME dialled calls list (+CPBW is not applicable for this storage)
"EN"	SIM (or ME) emergency number (+CPBW is not applicable for this storage)
"FD"	SIM fixdialling-phonebook
"MC"	ME missed (unanswered received) calls list (+CPBW not applicable for this storage)
"ME"	ME phonebook
"ON"	SIM (or ME) own numbers (MSISDNs) list (reading of this storage is also available using +CNUM)
"RC"	ME received calls list (+CPBW is not applicable for this storage)
"SM"	SIM phonebook
+CPBR	Read phonebook entries

	Command	Response	+cme error
Execute	+CPBR=<index1>,<index2>	[+CPBR: <index1>,<number>,<type>,<text>[[...] <CR><LF>+CPBR: <index2>,<number>,<type>,<text>]]	x
Test	+CPBR=?	+CPBR: (<index>-list),[<nlength>],[<tlength>]	x

The +CPBR command returns phonebook entries in the location number range <index1> ... <index2> from the current phonebook memory storage selected using the +CPBS. The entry fields returned are the location number <indexn>, the phone number stored there <number> (of the

format <type>) and text <text> associated with the number. If all the queried locations are empty (but available), no information text lines can be returned.

The test command returns the location range supported by the current storage as a compound value and the maximum lengths of the <number> and <text> fields. In the case of a SIM storage, the lengths may not be available.

Defined values

<index1>, <index2>, <index> Integer type values in the range of the location numbers of the phonebook memory.

<number> string type phone number of the format <type>
 <type> type of address octet in integer format (refer to GSM 04.08 10.5.4.7):
 129 unknown/telephony
 145 international/telephony
 <text> string type field of the maximum length of <tlength>
 <nlength> integer type value indicating the maximum length of the <number> field
 <tlength> integer type value indicating the maximum length of the <text> field

8.7 +CPBF Find phonebook entries

	Command	Response	+cme error
Execute	+CPBF=<findtext>	[+CPBF: <index1>,<number>,<type>,<text>[...] <CR><LF>+CPBF: <index2>,<number>,<type>,<text>]]	x
Test	+CPBF=?	+CPBF: [<nlength>],[<tlength>]	x

The +CPBF command returns phonebook entries (from the current phonebook memory storage selected using the +CPBS) which an alphanumeric field start with the <findtext> string. The entry fields returned are the location number <index*n*>, the phone number stored there <number> (of the format <type>) and text <text> associated with the number. If the searched text is not found in the entries in the current memory, the response is empty.

The test command returns the maximum lengths of the <number> and <text> fields. In the case of a SIM storage, the lengths may not be available.

Defined values

<index1>, <index2> integer type values in the range of location numbers of the phonebook memory

<number> string type phone number of the format <type>

<type> type of address octet in integer format (refer GSM 04.08 10.5.4.7):

129 unknown/telephony
 145 international/telephony

<findtext>, <text> string type field of the maximum length of <tlength>

<nlength> integer type value indicating the maximum length of the <number> field

<tlength> integer type value indicating the maximum length of the <text> field

8.8 +CPBW Write phonebook entry

	Command	Response	Default	+cme error
Execute	+CPBW=<index>,<number>,<type>,<text>		[,129/145]	x
Test	+CPBW=?	+CPBW: (<index>-list),[<nlength>],(129,145),[<tlength>]		x

The +CPBW command writes a phonebook entry in the location number <index> in the current phonebook memory storage selected using the +CPBS. The entry fields written are phone number <number> in the format <type> and text <text> associated with the number. If these fields are omitted, the phonebook entry is deleted.

The test command returns the location range supported by the current storage as a compound value, the maximum length of the <number> field, the supported number formats of the storage, and the maximum length of the <text> field. In the case of a SIM storage, the lengths may not be available.

Defined values

<index> integer type values in the range of the location numbers of the phonebook memory

<number> string type phone number of the format <type>

<type> type of address octet in integer format (refer GSM 04.08 10.5.4.7). The default value is 145 when dialling string includes the international access code character "+", otherwise 129:

129	unknown/telephony
145	international/telephony

<text> string type field of the maximum length of the <tlength>

<nlength> integer type value indicating the maximum length of the <number> field

<tlength> integer type value indicating the maximum length of the <text> field

8.9 +CIND Indicator control

	Command	Response	+cme error
set	+CIND=		X
read	+CIND?	+CIND: <ind>[,<ind>[,...]]	X
test	+CIND=?	<i>Dtp2v3, CDS1.2:</i> +CIND: ("message", (0,1)), ("call", (0,1)), ("roam", (0,1)), ("smsfull", (0,1)) <i>Nokia 22:</i> +CIND: ("message", (0,1)), ("call", (0,1)), ("roam", (0,1)), ("smsfull", (0,1)), ("signal", (0-5))	X

Optional. See ETSI GSM 07.07 /2/, section 8.9. Queries the current status of the ME physical indicators.

8.10 +CMER ME event reporting

	Command	Response	Default	+cme error
set	+CMER=<mode>, <keyp>, <disp>, <ind>[,0]		2,0,0,0[,0]	x
read	+CMER?	+CMER: <mode>, <keyp>, <disp>, <ind>,0		
Test	+CMER=?	<i>Dtp2v3, CDS1.2:</i> +CMER: (2),(0,2),(0),(0,1),(0) <i>Nokia 22 1.0:</i> +CMER: (2,3),(0),(0),(0,1),(0) <i>Nokia 22:</i> +CMER: (2,3),(0),(0),(0,1),(0)		

Mandatory when any of the +CKEV, +CDEV, or +CIEV result codes are implemented. See ETSI GSM 07.07 /2/, section 8.10. Enables/disables the presentation of the keypad, display and indicator unsolicited result codes.

9 ME ERROR COMMAND (GSM 07.07)

9.1 +CMEE Report mobile equipment error

	Command	Response	Default
Set	+CMEE=<n>		0
Read	+CMEE?	+CMEE: <n>	
Test	+CMEE=?	+CMEE: (0-2)	

The +CMEE command disables or enables the use of the result code +CME ERROR: <err> as an indication of an error relating to the functionality of the Nokia 22. When enabled, the ME related errors cause the +CME ERROR: <err> final result code instead of the regular ERROR final result code. ERROR is returned normally when an error is related to the syntax or invalid parameters.

The test command returns the supported values.

Defined values

<n>:

- 0 disable +CME ERROR: <err> result code and use ERROR instead
- 1 enable +CME ERROR: <err> result code and use numeric <err> values
- 2 enable +CME ERROR: <err> result code and use verbose <err> values

See also the result code +CME ERROR.

10 SMS COMMANDS (GSM 07.05)

10.1 +CSMS Select message service

	Command	Response	Default
Set	+CSMS=<service>	+CSMS: 1,1,1	0
Read	+CSMS?	+CSMS: <service>,1,1,1	
Test	+CSMS=?	+CSMS: (0,1)	

The +CSMS command selects the messaging service <service>.

The read command returns the current service setting.

The test command returns a list of all the supported services.

Defined values

<service>:

- 0 GSM 03.40 and 03.41 (the syntax of the SMS AT commands is compatible with GSM 07.05 Phase 2, version 4.7.0; The phase 2+ features which do not require a new command syntax may be supported (e.g. correct routing of messages with new Phase 2+ data coding schemes)
- 1 GSM 03.40 and 03.41 (the syntax of the SMS AT commands is compatible with the GSM 07.05 Phase 2+ version; the requirement of the setting 1 is mentioned under the corresponding command descriptions)

10.2 +CPMS Preferred message storage

	Command	Response	Default	+cms error
Set	+CPMS=<mem1> > ,<mem2> ,<mem3>	+CPMS: <used1>,<total1>,<used2>, <total2>,<used3>,<total3>	"SM","SM","SM"	x
Read	+CPMS?	+CPMS: <mem1>,<used1>,<total1>,<mem2>, <used2>,<total2>,<mem3>,<used3>,<total3>		x
Test	+CPMS=?	+CPMS: ("ME","SM"),("ME","SM"),("SM")		

The +CPMS command selects the memory storage <mem1>, <mem2> and <mem3> to be used for reading, writing, etc.

The test command returns lists of the supported memory storage.

Defined values

- <mem1> memory from which messages are read and deleted (the commands List Messages +CMGL, Read Message +CMGR and Delete Message +CMGD)
 - <mem2> memory to which writing and sending operations are made (the commands Send Message from Storage +CMSS and Write Message to Memory +CMGW)
 - <mem3> memory to which received SMs are preferred to be stored (unless forwarded directly to the TE; refer to the command New Message Indications +CNMI); the received CBMs are always stored in the "BM" (or some manufacturer specific storage) unless directly forwarded to the TE; the received status reports are always stored in the "SR" (or a manufacturer specific storage) unless directly forwarded to the TE
 - "ME" ME message storage
 - "SM" SIM message storage
- <usedx> integer type; the number of messages currently in <memx>
- <totalx> integer type; the total number of message locations in <memx>

10.3 +CMGF Message format

	Command	Response	Default
Set	+CMGF=<mode>		0
Read	+CMGF?	+CMGF: <mode>	
Test	+CMGF=?	+CMGF: (0,1)	

The +CMGF command tells the Nokia 22 the input and output format of messages to be used. <mode> indicates the format of the messages used with the send, list, read and write commands and the unsolicited result codes resulting from the received messages. The mode can be either the PDU mode (entire TP data units used) or the text mode (headers and body of the messages given as separate parameters). The text mode uses the character set specified by the command Select TE Character Set +CSCS to be used in the message body.

The test command returns the supported modes as a compound value.

Defined values

<mode>:

- 0 PDU mode
- 1 text mode

10.4 +CSCA Service centre address

	Command	Response	Default
Set	+CSCA=<sca>,<tosca>		"" ,129
Read	+CSCA?	+CSCA: <sca>,<tosca>	
Test	+CSCA=?		

The +CSCA command updates the SMSC address through which mobile originated SMs are transmitted. In the text mode, the setting is used by the send and write commands. In the PDU mode, the setting is used by the same commands, but only when the length of the SMSC address coded into TPDU equals zero. The SMSC address may change also when the +CRES is taken action.

The read command returns the current SMSC address settings.

Defined values

<sca> GSM 04.11 RP SC address Address-Value field in string format

<tosca> GSM 04.11 RP SC address Type-of-Address octet in integer format:

- 129 unknown/telephony
- 145 international/telephony

10.5 +CSMP Set text mode parameters

	Command	Response	Default
Set	+CSMP=<fo>,<vp>,<pid>,<dc>		17,167,0,0
Read	+CSMP?	+CSMP: <fo>,<vp>,<pid>,<dc>	
Test	+CSMP=?		

The +CSMP command is used to select values for the additional parameters needed when the SM is sent to the network or placed in a storage when the text format message mode is selected. It is possible to set the validity period starting from the moment when the SM is received by the SMSC (<vp> is in range 0... 255) or to define the absolute time of the validity period termination (<vp> is a string). The format of <vp> is given by <fo>. The values of these parameters may change also when the +CRES is used.

NOTE: When storing a SMS-DELIVER from the TE to the preferred memory storage in the text mode (refer command Write Message to Memory +CMGW), the <vp> field can be used for <scts>.

Defined values

<fo> first octet of GSM 03.40 SMS-DELIVER or SMS-SUBMIT in integer format

<vp> depending on the SMS-SUBMIT <fo> setting: GSM 03.40 TP-Validity-Period either in integer format or in time-string format

<pid> GSM 03.40 TP-Protocol-Identifier in integer format

<dc> GSM 03.38 SMS Data Coding Scheme in integer format

10.6 +CSDH Show text mode parameters

	Command	Response	Default
Set	+CSDH=<show>		0
Read	+CSDH?	+CSDH: <show>	
Test	+CSDH=?	+CSDH: (0,1)	

The +CSDH command controls whether detailed header information is shown in the text mode result codes.

The test command returns the supported values as a compound value.

Defined values

<show>:

- 0 do not show header values defined in the commands +CSCA and +CSMP (<sca>, <tosca>, <fo>, <vp>, <pid> and <dcsc>) nor <length>, < toda> or < tooa> in the +CMT, +CMGL, +CMGR result codes for SMS-DELIVERs and SMS-SUBMITs in the text mode; for SMS-COMMANDs in the +CMGR result code, do not show <pid>, <mn>, <da>, <toda>, <length> or <cdata>
- 1 show the values in result codes

10.7 +CSCB Select cell broadcast message types

	Command	Response	Default	+cms error
Set	+CSCB=<mode>,<mids>,<dcsc>		0,"",""	x
Read	+CSCB?	+CSCB: <mode>,<mids>,<dcsc>		
Test	+CSCB=?	+CSCB: (0,1)		

The +CSCB command defines the types of CBMs that are to be received.

The test command returns the supported modes as a compound value.

Defined values

<mode>:

- 0 message types specified in <mids> and <dcsc> are accepted
 - 1 message types specified in <mids> and <dcsc> are not accepted
- <mids> string type, all the possible combinations of GSM 03.41 CBM message identifiers, e.g. "0,1,5,320-478,922"
- <dcsc> string type, all the possible combinations of 03.38 CBM data coding schemes, e.g. "0-3,5"

10.8 +CSAS Save settings

	Command	Response	Default	+cms error
Execute	+CSAS=<profile>		[1]	x
Test	+CSAS=?	+CSAS: (0,1)		x

The +CSAS command saves active message service settings to a non-volatile memory. The settings specified in the commands Service Centre Address +CSCA, Set Message Parameters +CSMP and Select Cell Broadcast Message Types +CSCB are saved. The SMSC address is not stored if +CSCA is not set/restored during the current session (i.e. +CSCA? returns +CSCA: "",129). The protocol id (<pid>), data coding scheme (<dc>) and validity period (<vp>) are not stored if the +CSMP parameter <fo> does not indicate SMS-SUBMIT (i.e. bits 1-0 are not '01'). In addition, the validity period is not stored if <fo> does not indicate the relative validity period format (i.e. bits 4-3 are not '10'). The destination address or alpha tag cannot be stored through an AT interface.

NOTE: The values that are not stored shall remain intact.

The test command shall display the supported profile numbers for reading and writing of settings.

10.9 +CRES Restore settings

	Command	Response	Default	+cms error
Execute	+CRES=<profile>		[1]	x
Test	+CRES=?	+CRES: (0,1)		x

The +CRES command restores message service settings from the non-volatile memory to the active memory. The settings specified in the commands Service Centre Address +CSCA, Set Message Parameters +CSMP and Select Cell Broadcast Message Types +CSCB are restored. If the protocol id, data coding scheme or validity period is restored, the +CSMP parameter <fo> is forced to be SMS-SUBMIT (i.e. bits 1-0 are set to '01'). In addition, if a validity period is restored, <fo> is forced to indicate the relative validity period format (i.e. bits 4-3 are set to '10'). The rest of the <fo> bits are set to zero.

The test command shall display the supported profile numbers.

10.10 +CNMI New message indications to TE

	Command	Response	Default	+cms error
Set	+CNMI=<mode>,<mt>,<bm>,<ds>,<bfr>		0,0,0,0,0	x
Read	+CNMI?	+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>		
Test	+CNMI=?	+CNMI: (0-2),(0-3),(0,2,3),(0-2),(0,1)		

The +CNMI command defines the procedure for indicating the receiving of new messages from the network to the TE when the TE is active, e.g. DTR signal is ON. If the TE is inactive (e.g. DTR signal is OFF), message receiving should be done as specified in GSM 03.38.

<mode> controls the processing of unsolicited result codes specified within this command, <mt> sets the result code indication routing for SMS-DELIVERs, <bm> for CBMs and <ds> for SMS-STATUS-REPORTs. <bfr> defines the handling method for buffered result codes when <mode> 1 or 2 is enabled.

The test command gives the supported setting values.

Defined values

<mode> the setting affects only to unsolicited result codes specified within this command:

- 0 Buffer unsolicited result codes in the Nokia 22. If the Nokia 22 result code buffer is full, the oldest indications will be discarded and replaced with the new received indications.
- 1 Discard indication and reject new received message unsolicited result codes when the control link is reserved (e.g. in on-line data mode). Otherwise forward them directly to the TE.
- 2 Buffer unsolicited result codes in the Nokia 22 when the control link is reserved (e.g. in the on-line data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE.

NOTE: The result code buffer is in the volatile memory, messages may get lost if the Nokia 22 is switched off before the codes are sent to TE.

<mt> The rules for storing received SMS depend on its data coding scheme (refer to GSM 03.38), preferred memory storage (+CPMS) setting, and this value:

- 0 No SMS-DELIVER indications are routed to the TE.
If SMS-DELIVER is stored into the Nokia 22, an indication of the memory location is routed to the TE using an unsolicited result code: +CMTI: <mem>,<index>
- 1 SMS-DELIVERs (except for class 2 messages and messages in the message waiting indication group (store message)) are routed directly to the TE using an unsolicited result code:
 - +CMT: <length><CR><LF><pdu> (PDU mode enabled)
 - or
 - +CMT: <oa>,<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data> (text mode enabled; about parameters in italics, refer to the command Show Text Mode Parameters +CSDH)
 Class 2 messages and messages in the message waiting indication group (store message) result in an indication as defined in <mt>=1.
- 3 Class 3 SMS-DELIVERs are routed directly to the TE using unsolicited result codes defined in <mt>=2. The messages of other data coding schemes result in an indication as defined in <mt>=1.

<bm> the rules for storing received CBMs depend on its data coding scheme (refer GSM 03.38), the setting of the Select CBM Types (+CSCB), and this value:

- 0 No CBM indications are routed to the TE.
- 2 New CBMs are routed directly to the TE using an unsolicited result code:
 - +CBM: <length><CR><LF><pdu> (PDU mode enabled)
 - or +CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data> (textmode enabled)
- 3 Class 3 CBMs are routed directly to the TE using unsolicited result codes defined in <bm>=2. If the CBM storage is supported, the messages of other classes result in an indication as defined in <bm>=1.

<ds>:

- 0 No SMS-STATUS-REPORTs are routed to the TE.
- 1 SMS-STATUS-REPORTs are routed to the TE using an unsolicited result code:
 +CDS: <length><CR><LF><pdu> (PDU mode enabled)
 or
 +CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> (text mode enabled)
- 2 If SMS-STATUS-REPORT is stored into the Nokia 22, an indication of the memory location is routed to the TE using an unsolicited result code:
 +CDSI: <mem>,<index>

<bfr>:

- 0 the Nokia 22 buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1-2 is entered (the OK response shall be given before flushing the codes).
- 1 the Nokia 22 buffer of unsolicited result codes defined within this command is cleared when <mode> 1-2 is entered.

10.11 +CMGL List messages

	Command	Response	Default	+cms error
Execute	+CMGL= <stat>	Text mode (+CMGF=1), SMS-DELIVER or SMS-SUBMIT: +CMGL: <index>,<stat>,<oa/da>,[<scts>] [,<toa/toda>,<length>]<CR><LF><data>[<CR><LF> +CMGL: <index>,<stat>,<oa/da>,[<scts>] [,<toa/toda>,<length>]<CR><LF><data>[...]] text mode (+CMGF=1), SMS-STATUS-REPORT: +CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>[<CR><LF> +CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>[...]] text mode (+CMGF=1), SMS-COMMAND: +CMGL: <index>,<stat>,<fo>,<ct>[<CR><LF> +CMGL: <index>,<stat>,<fo>,<ct>[...]] PDU mode (+CMGF=0): +CMGL: <index>,<stat>,<length><CR><LF><pdu> [<CR><LF>+CMGL:<index>,<stat>,<length> <CR><LF><pdu>[...]]	["REC UNREAD"/0]	x
Test	+CMGL=?	Text mode (+CMGF=1): +CMGL: ("REC UNREAD","ALL") PDU mode (+CMGF=0): +CMGL: (0,4)		

Text mode:

The +CMGL command returns the messages with the status value <stat> from a message storage to the TE. If the status of the message is 'received unread', the status in the storage changes to

'received read'.

NOTE: If the selected <mem1> can contain different types of SMS (e.g. SMS-DELIVERs, SMS-SUBMITs, SMS-STATUS-REPORTs and SMS-COMMANDs), the response may be a mix of the responses of the different SM types. The TE application can recognise the response format by examining the third response parameter.

The test command shall give a list of all the supported status values.

PDU mode:

The +CMGL command returns messages with the status value <stat> from the preferred message storage <mem1> to the TE. Entire data units <pdu> are returned. If the status of the message is 'received unread', the status in the storage changes to 'received read'.

Defined values

<stat> integer type in the PDU mode (default 0), or string type in the text mode; indicates the status of the message in the memory:

0	"REC UNREAD" received unread message (i.e. new message)
1	"REC READ" received read message
2	"STO UNSENT" stored unsent message (only applicable to SMSs)
3	"STO SENT" stored sent message (only applicable to SMSs)
4	"ALL" all messages (only applicable to the +CMGL command)

<index> integer type value in the range of location numbers

<oa/da> GSM 03.40 TP-Originating/Destination-Address Address-Value field in string format; type of address given by <tooda/toda>

<scts> GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format

<tooa/toda>/<tora> GSM 04.11 TP-Originating/Destination-Address Type-of-Address octet in integer format

129	unknown/telephony
145	internal/telephony

<length> integer type value that indicates the length of the message body <data> in characters in the text mode (+CMGF=1); or integer type value that indicates the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length) in the PDU mode (+CMGF=0),

<data> SMS: GSM 03.40 TP-User-Data in the text mode responses

<fo> first octet of GSM 03.40 SMS-DELIVER, SMS-SUBMIT, SMS-STATUS-REPORT, or SMS-COMMAND in integer format

<mr> GSM 03.40 TP-Message-Reference in integer format

<ra> GSM 03.40 TP-Recipient-Address Address-Value field in string format; the type of address is given by <tora>

<dt> GSM 03.40 TP-Discharge-Time in time-string format: "yy/MM/dd,hh:mm:ss±zz"

<st> GSM 03.40 TP-Status in integer format

<ct> GSM 03.40 TP-Command-Type in integer format

<pdu> GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format

10.12+CMGR Read message

	Command	Response	+cms error
Execute	+CMGR= <index>	text mode (+CMGF=1), SMS-DELIVER: +CMGR: <stat>,<oa>,<scts>[,<tooa>,<fo>,<pid>,<dcsc>,<sca>,<tosca>,<length>]<CR><LF><data> text mode (+CMGF=1), SMS-SUBMIT: +CMGR: <stat>,<da>,<toda>,<fo>,<pid>,<dcsc>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data> text mode (+CMGF=1), SMS-STATUS-REPORT: +CMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> text mode (+CMGF=1), SMS-COMMAND: +CMGR: <stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length>]<CR><LF><cdata> PDU mode (+CMGF=0): +CMGR: <stat>,<length><CR><LF><pdu>	x
Test	+CMGR=?		

Text mode:

The +CMGR command returns a message with the location value <index> from the message storage. If the status of the message is 'received unread', the status in the storage changes to 'received read'.

PDU mode:

The +CMGR command returns a message with the location value <index> from the preferred message storage to the TE. The status of the message and the entire message data unit <pdu> is returned. If the status of the message is 'received unread', the status in the storage changes to 'received read'.

Defined values

<index> integer type; value in the range of the location numbers

<stat> integer type in the PDU mode (default 0), or string type in the text mode; indicates the status of the message in the memory:

- 0 "REC UNREAD" received unread message (i.e. new message)
- 1 "REC READ" received read message
- 2 "STO UNSENT" stored unsent message (only applicable to SMS)
- 3 "STO SENT" stored sent message (only applicable to SMS)
- 4 "ALL" all messages (only applicable to the +CMGL command)

<oa>/<da> GSM 03.40 TP-Originating/Destination-Address Address-Value field in string format; the type of address is given by <tooda>/<toda>

<scts> GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format

<tooa>/<toda>/<tora> GSM 04.11 TP-Originating/Destination-Address Type-of-Address octet in integer format

129 unknown/telephony

145 internal/telephony

<fo> first octet of GSM 03.40 SMS-DELIVER, SMS-SUBMIT, SMS-STATUS-REPORT, or SMS-COMMAND in integer format

<pid> GSM 03.40 TP-Protocol-Identifier in integer format

<dcs> GSM 03.38 SMS Data Coding Scheme in integer format

<sca> GSM 04.11 RP SC address Address-Value field in string format, type of address given by <tosca>

<tosca> GSM 04.11 RP SC address Type-of-Address octet in integer format

129 unknown/telephony

145 internal/telephony

<length> integer type value that indicates the length of the message body <data> in characters in the text mode (+CMGF=1); or that indicates the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length) in the PDU mode (+CMGF=0).

<data> SMS: GSM 03.40 TP-User-Data in text mode responses

<vp> GSM 03.40 TP-Validity-Period either in integer format or in time-string format (refer <dt>)

<mr> GSM 03.40 TP-Message-Reference in integer format

<ra> GSM 03.40 TP-Recipient-Address Address-Value field in string format; type of address given by <tora>

<dt> GSM 03.40 TP-Discharge-Time in time-string format: "yy/MM/dd,hh:mm:ss±zz"

<st> GSM 03.40 TP-Status in integer format

<ct> GSM 03.40 TP-Command-Type in integer format

<mn> GSM 03.40 TP-Message-Number in integer format

<pdu> GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format

10.13 +CNMA New message acknowledgement to ME/TA

	Command	Response	+cms error
Execute	text mode (+CMGF=1): +CNMA PDU mode (+CMGF=0): +CNMA=<n>,<length><CR>PDU is given<ctrl-Z/ESC>		x
Test	+CNMA=?	PDU mode (+CMGF=0): +CNMA: (0-2)	

Text mode:

The +CNMA command confirms the correct reception of a new message (SMS-DELIVER or SMS-STATUS-REPORT) which is routed directly to the TE. This acknowledgement command (causing the Nokia 22 to send RP-ACK to the network) shall be used when the +CSMS parameter <service> equals 1. The Nokia 22 shall not send another +CMT or +CDS result code to the TE before the previous one is acknowledged.

If the Nokia 22 does not get acknowledgement within the required time (network timeout), the Nokia 22 will send a RP-ERROR to the network. Routing to the TE will automatically be disabled by setting both <mt> and <ds> values of +CNMI to zero.

PDU mode:

The +CNMA command confirms the reception of a new message (SMS-DELIVER or SMS-STATUS-REPORT) which is routed directly to the TE. This acknowledgement command shall be used when the +CSMS parameter <service> equals 1. In the PDU mode, it is possible to send either a positive (RP-ACK) or a negative (RP-ERROR) acknowledgement to the network. The parameter <n> defines which acknowledgement will be sent. Optionally (when <length> is greater than zero), an acknowledgement TPDU (SMS-DELIVER-REPORT for RP-ACK or RP-ERROR) may be sent to the network. The entering of the PDU is done similarly as specified in the command Send Message +CMGS, except that the format of <ackpdu> is used instead of <pdu> (i.e. SMSC address field is not present). The PDU shall not be bounded by double quotes. The TA shall not send another +CMT or +CDS result code to the TE before the previous code is acknowledged.

If the Nokia 22 does not get an acknowledgement within the required time (network timeout), the ME should send an RP-ERROR to the network. The Nokia 22 shall automatically disable routing to the TE by setting both <mt> and <ds> values of the +CNMI to zero.

The test command returns a list of supported <n> values. If the only value that is supported is 0, the device does not support the sending of TPDU.

Defined values

<n>:

- 0 command operates as defined for the text mode
- 1 send RP-ACK (or buffered result code received correctly)
- 2 send RP-ERROR (if PDU is not given, the Nokia 22 shall send an SMS-

DELIVER-REPORT with a GSM 03.40 TP-FCS value set to 'FF' (unspecified error cause))

<length> the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length)

10.14 +CMGS Send message

	Command	Response	Default	+cms error
Execute	Text mode (+CMGF=1): +CMGS=<da>,<toda><CR> text is entered<ctrl-Z/ESC>	text mode (+CMGF=1) and sending ok: +CMGS: <mr>[,<scts>]	text mode: [,129/145]	x
	PDU mode (+CMGF=0): +CMGS=<length><CR> PDU is given<ctrl-Z/ESC>	PDU mode (+CMGF=0) and sending ok: +CMGS: <mr>[,<ackpdu>]		
Test	+CMGS=?			

Text mode:

The +CMGS command sends message to the network (SMS-SUBMIT). The message reference value <mr> is returned to the TE when a message is successfully delivered. Optionally (when +CSMS <service> value is 1 and the network supports), <scts> is returned. Values can be used to identify a message upon unsolicited delivery status report result code.

PDU mode:

The +CMGS command sends a message from a TE to the network (SMS-SUBMIT). The message reference value <mr> is returned to the TE when a message is successfully delivered. Optionally (when +CSMS <service> value is 1 and the network supports), <ackpdu> is returned. Values can be used to identify a message upon an unsolicited delivery status report result code.

The text/PDU entering is as specified in 07.05. If the SMSC address is not set/restored during the current session (i.e. +CSCA? returns +CSCA: "",129), it must automatically be read from the SIM/ME (location 1). In the PDU mode, all kinds of GSM 03.40 MO TPDUs can be sent with this command (operation equals +CMGC).

Defined values

<da> GSM 03.40 TP-Destination-Address Address-Value field in string format; the type of address is given by <toda>

<toda> GSM 04.11 TP-Destination-Address Type-of-Address octet in integer format

129 unknown/telephony
145 internal/telephony

<mr> GSM 03.40 TP-Message-Reference in integer format

<scts> GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format

<length> the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length)

<ackpdu> GSM 03.40 RP-User-Data element of RP-ACK PDU

10.15+CMSS Send message from storage

	Command	Response	Default	+cms error
Execute	+CMSS=<index>,<da>,<toda>	text mode (+CMGF=1) and sending ok: +CMSS: <mr>[,<scts>] PDU mode (+CMGF=0) and sending ok: +CMSS: <mr>[,<ackpdu>]	[, "", 129/145]	x
Test	+CMSS=?			

Text mode:

The +CMSS command sends a message with the location value <index> from a preferred message storage <mem2> to the network (SMS-SUBMIT or SMS-COMMAND). If a new recipient address <da> is given for the SMS-SUBMIT, it shall be used instead of the one stored with the message. The reference value <mr> is returned to the TE on a successful message delivery. Optionally (when +CSMS <service> value is 1 and network supports), <scts> is returned. Values can be used to identify a message upon an unsolicited delivery status report result code.

PDU mode:

The +CMSS command sends a message with the location value <index> from a message storage <mem2> to the network (SMS-SUBMIT or SMS-COMMAND). If the new recipient address <da> is given for the SMS-SUBMIT, it shall be used instead of the one stored with the message. The reference value <mr> is returned to the TE when a message is successfully delivered. Optionally (when +CSMS <service> value is 1 and network supports), <ackpdu> is returned. Values can be used to identify a message upon an unsolicited delivery status report result code.

Defined values

<index> integer type; a value in the range of the location numbers supported by the associated memory

<da> GSM 03.40 TP-Destination-Address Address-Value field in string format; type of address given by <toda>

<toda> GSM 04.11 TP-Destination-Address Type-of-Address octet in integer format

129	unknown/telephony
145	internal/telephony

<mr> GSM 03.40 TP-Message-Reference in integer format

<scts> GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format

<ackpdu> GSM 03.40 RP-User-Data element of RP-ACK PDU

10.16+CMMS More messages to send

Parameter Command Syntax

Command	Possible response(s)
+CMMS=[<n>]	
+CMMS?	+CMMS: <n>
+CMMS=?	+CMMS: (list of supported <n>s)

Description

The set command controls the continuity of SMS relay protocol link. When the feature is enabled (and supported by network), multiple messages can be sent much faster as the link is kept open. The test command returns the supported values as a compound value.

Defined Values

<n>:

- 0 disable
- 1 keep enabled until the time between the response of the latest message send command (+CMGS, +CMSS, etc.) and the next send command exceeds 1-5 seconds (the exact value is up to the ME implementation), then the ME shall close the link and the TA automatically switches <n> back to 0
- 2 enable (if the time between the response of the latest message send command and the next send command exceeds 1-5 seconds (the exact value is up to the ME implementation), the ME shall close the link but the TA shall not automatically switch back to <n>=0)

An example of the sending of a default alphabet message in the text mode and a SMS-STATUS-REPORT is wanted:

```

AT+CNMI?                (check that status reports are routed to TE)
+CNMI: 2,1,0,1,0
OK
AT+CSMP=32,167,0,0      (status report wanted; otherwise default settings)
OK
AT+CMGS="+358501234567" (start editing a message)
> This the first line.  (edit first line and press carriage return)
> This is the last line.^Z (edit second line and send message by pressing control-Z)
+CMGS: 10                (success: message reference 10 returned from SMSC)
OK
+CDS: 2,10,"+358501234567",145,"95/07/04/13:12:14+04",
"95/07/04/13:12:20+04",0 (status report of successful message delivery received)
    
```

Storing an unsent message in the memory, sending it from there, and deleting it:

```

AT+CPMS?                (check memory settings)
+CPMS: "ME",4,10,"ME",4,10,"ME",4,10
OK
AT+CMGW="9501231234"    (write message)
> This is the message body^Z
+CMGW: 7                (index number in storage returned)
OK
AT+CMSS=7                (send from storage)
+CMSS: 12                (success: reference value 12 sent from SC)
OK
AT+CMGD=7                (delete message)
    
```


OK

10.17 +CMGW Write message to memory

	Command	Response	Default	+cms error
Execute	Text mode (+CMGF=1): +CMGW=<oa/da>,<tooa/toda>,<stat> <CR>text is entered<ctrl-Z/ESC> PDU mode (+CMGF=0): +CMGW=<length>,<stat><CR> PDU is given<ctrl-Z/ESC>	storing successful: +CMGW: <index>	text mode: [,129/145, "STO UNSENT"] PDU mode: [,2]	x
Test	+CMGW=?			

Text mode:

The +CMGW command stores a message (either SMS-DELIVER or SMS-SUBMIT) to the memory storage <mem2>. A memory location <index> of the stored message is returned. By default, the message status will be set to 'stored unsend', but the parameter <stat> also allows other status values to be given. The entering of text is done similarly as specified in the command Send Message +CMGS.

NOTE: SMS-COMMANDS and SMS-STATUS-REPORTs can not be stored in the text mode.

PDU mode:

The +CMGW command stores a message to the memory storage <mem2>. A memory location <index> of the stored message is returned. By default, the message status will be set to 'stored unsend', but the <stat> parameter also allows other status values to be given.

Text/PDU entering is as specified in ETSI GSM 07.05 /3/. If the SMSC address is not set/restored during the current session (i.e. +CSCA? returns +CSCA: "",129) and the stored message is SMS-SUBMIT or SMS-COMMAND, the SMSC address must automatically be read from the SIM/ME (location 1).

Defined values

<oa>/<da> GSM 03.40 TP-Originating/Destination-Address Address-Value field in string format; the type of address is given by <tooda>/<toda>

<scts> GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format

<tooa>/<toda>/<tora> GSM 04.11 TP-Originating/Destination-Address Type-of-Address octet in integer format

129 unknown/telephony

145 internal/telephony

<stat> integer type in the PDU mode (default 0), or string type in the text mode; indicates the status of a message in the memory:

0 "REC UNREAD" received unread message (i.e. new message)

1 "REC READ" received read message

2 "STO UNSENT" stored unsend message (only applicable to SMS)

- 3 "STO SENT" stored sent message (only applicable to SMS)
- 4 "ALL" all messages (only applicable to +CMGL command)

<index> integer type; value in the range of the location numbers

<length> integer type value that indicates the length of the message body <data> in characters in the text mode (+CMGF=1); or that indicates the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length) in the PDU mode (+CMGF=0).

10.18 +CMGD Delete message

	Command	+cms error
Execute	+CMGD=<index>	X
Test	+CMGD=?	

The +CMGD command deletes a message from a preferred message storage location <index>.

10.19 +CMGC Send command

	Command	Response	Default	+cms error
Execute	text mode (+CMGF=1): +CMGC=<fo>,<ct>,<pid>,<mn>,<da>,<tda><CR>text is entered<ctrl-Z/ESC> PDU mode (+CMGF=0): +CMGC=<length><CR> PDU is given<ctrl-Z/ESC>	text mode (+CMGF=1) and sending ok: +CMGC: <mr>[,<scts>] PDU mode (+CMGF=0) and sending ok: +CMGC: <mr>[,<ackpdu>]	text mode: [2,0,0,0,"",129/145]	x
Test	+CMGC=?			

Text mode:

The +CMGC command sends a command message from a TE to the network (SMS-COMMAND). The entering of text (GSM 03.40 TP-Command-Data) is done as specified in the command Send Message +CMGS, but the format is fixed to be a sequence of two IRA character long hexadecimal numbers which Nokia 22 converts into 8-bit octets. The message reference value <mr> is returned to the TE when a message is successfully delivered. Optionally (when +CSMS <service> value is 1 and network supports), <scts> is returned. Values can be used to identify a message upon an unsolicited delivery status report result code.

PDU mode:

The +CMGC command sends a command message from a TE to the network (SMS-COMMAND). The message reference value <mr> is returned to the TE on a successful message delivery. Optionally (when +CSMS <service> value is 1 and the network supports), <ackpdu> is returned. Values can be used to identify a message upon an unsolicited delivery status report result code.

Text/PDU entering is as specified in ETSI GSM 07.05. If the SMSC address is not set/restored during the current session (i.e. +CSCA? returns +CSCA: "",129) it must automatically be read from

the SIM/ME (location 1). In the PDU mode, all kinds of GSM 03.40 MO TPDU's can be sent with this command (operation equals +CMGS).

Defined values

<fo> first octet of GSM 03.40 SMS-COMMAND in integer format

<ct> GSM 03.40 TP-Command-Type in integer format

<pid> GSM 03.40 TP-Protocol-Identifier in integer format

<mn> GSM 03.40 TP-Message-Number in integer format

<da> GSM 03.40 TP-Destination-Address Address-Value field in string format; the type of address is given by <toada>/<toda>

<toada> GSM 04.11 TP-Destination-Address Type-of-Address octet in integer format

129 unknown/telephony

145 internal/telephony

<mr> GSM 03.40 TP-Message-Reference in integer format

<scts> GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format

<length> in the PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length)

<ackpdu> GSM 03.40 RP-User-Data element of RP-ACK PDU

11 VOICE COMMANDS**11.1 +VTS DTMF generation**

	Command	Response
Execute	+VTS=<dtmf>,<dtmf>,...	
Test	+VTS=?	(,),(,)

The +VTS command sends Dual Tone Multiple Frequency (DTMF) voices during a call. The dialling command can also be used to send DTMFs (see the D command).

Defined values

<dtmf> DTMF digit: 0 - 9, *, #

12 MISCELLANEOUS COMMANDS

12.1 V.25ter

12.1.1 A/ Repeat last command line

As first chars of a command line, A/ repeats the previous command line from the Nokia 22 command line buffer. Lowercase (a/) is also accepted.

12.1.2 S47 Force fax class 2/2.0 error correction mode

	Command	Response	<n> values
Set	S47=<n>		0..2 (default 0)
Read	S47?	<n>	000..002

It is recommended that this command should be used when the fax ECM is implemented. The command is used to force the ECM on, because fax software is not always capable of enabling it.

Defined values

<n>:

- 0 disabled
- 1 enabled with 64 byte frames
- 2 enabled with 256 byte frames

13 FAX COMMANDS

The following standard facsimile (+F) command sets are supported by Nokia 22 according to GSM 03.45 facsimile group 3 transparent. The specification of these commands is out of the scope of this document. The command structures can be found in the referred standards:

- Class 1, TIA-578-A /4/
- Class 2, TIA SP-2388 /6/
- Class 2.0, TIA-592 and ITU-T T.32 /7/

In the classes 2 and 2.0, the Nokia 22 Error supports the correction mode (ECM) with 16k send and receive buffers. The facsimile commands supported by the Nokia 22 are listed below.

13.1 TIA-578-A

+FCLASS	Select, read or test Service Class
+FMI	Report manufacturer identification
+FMM	Request model identification
+FMR	Request revision identification
+FTS	Transmit silence
+FRS	Receive silence
+FTM	Facsimile transmit
+FRM	Facsimile receive
+FTH	HDLC transmit
+FRH	HDLC receive
+FLO	Flow control select
+FPR	Serial port rate control
+FDD	Double Escape Character Replacement

13.2 TIA-592

+FCLASS	Select, read or test Service Class
+FMI	Report manufacturer identification
+FMM	Request model identification
+FMR	Request revision identification
D	Originate command
A	Answer command
+FDT	Data transmission
+FDR	Data reception
+FKS	Session termination
+FIP	Initialise facsimile parameters
+FCC	DCE capabilities parameters
+FIS	Current session parameters
+FCS	Current session results
+FLI	Local ID strings
+FPI	Local polling ID strings
+FNS	Non-standard frame FIF octet string
+FLP	Indicate document to poll
+FSP	Request to poll

+FCR	Capability to receive
+FBU	HDLC frame reporting
+FNR	Negotiation message reporting
+FIE	Procedure interrupt enable
+FPS	Page status
+FCQ	Copy quality checking
+FRQ	Receive quality thresholds
+FAA	Adaptive answer
+FCT	DTE phase C response timeout
+FHS	Call termination status
+FRY	ECM retry count
+FMS	Minimum phase C speed
+FLO	Flow control select
+FPR	Serial port rate control
+FPP	Packet protocol control
+FBO	Data bit order
+FEA	Phase C received EOL alignment
+FFC	Format conversion
+FBS	Buffer size

13.3 TIA SP-2388

+FCLASS	Select, read or test Service Class
+FMFR	Request manufacturer identification
+FMDL	Request model identification
+FREV	Request product revision identification
D	Originate a call
A	Answer a call
+FDT	Data transmission
+FET	Transmit page punctuation
+FDR	Begin or continue phase C receive data
+FDCC	Establish DCE capabilities
+FK	Session termination
+FDIS	Current session parameters
+FDCS	Current session results
+FLID	Local ID string
+FCIG	Local polling ID string
+FLPL	Indicate document to poll
+FSPL	Request to poll
+FCR	Capability to receive
+FBUG	Session message reporting
+FECM	Error correction mode control
+FPTS	Page transfer status
+FCQ	Copy quality checking
+FBADMUL	Error threshold multiplier
+FBADLIN	Bad line threshold
+FPHCTO	DTE phase C response timeout
+FAXERR	T.30 session error report
+FCTCRTY	ECM retry count
+FMINSPL	Minimum phase C speed

+FTBC	Phase C transmit data block size
+FRBC	Phase C receive data block size
+FBOR	Data bit order
+FREL	Phase C received EOL alignment
+FVRFC	Vertical resolution format conversion
+FDFFC	Data compression format conversion
+FLNFC	Page length format conversion
+FWDFC	Page width format conversion
+FAA	Answer parameter
+FBUF	Buffer size

14 RESULT CODES

14.1 V.25ter

14.1.1 Basic syntax result codes

OK, ERROR, BUSY, CONNECT, CONNECT <rate>, NO ANSWER, NO CARRIER: See the ITU-T Recommendation V.25ter, section 5.7.1 and the X, D, A and O commands in this document. Note that OK can be a result of a successful remotely initiated in-call modification from data to speech mode, and CONNECT[<rate>] can be a result of a successful remotely initiated in-call modification from speech to data mode. NO CARRIER can also indicate a remote hang-up of a speech call.

RING: See ETSI GSM 07.07 /2/, section 7.12. See the ITU-T Recommendation V.25ter, section 6.3.4 and the +CRC command in this document. The MT voice calls or alternating voice/data calls starting with voice shall not result to this indication. When the RING result code is enabled (+CRC=0), alternating MT voice/fax calls starting with voice shall automatically be switched into the fax mode by the Nokia 22 (if +CMOD=0). Note that the RING result code is not given for waiting calls.

14.1.2 +DR Data compression report

Format	Description
+DR: <type>	given when +DR=1; informs about the presence of V.42bis data compression in the established connection

The +DR intermediate result code, if enabled, is issued after the Error Control Report (+ER) and before the final result code (e.g. CONNECT).

Defined values

<type>:

NONE	Data compression is not in use
V42B	V.42 bis is in use in both directions
V42B RD	V.42 bis is in use in receive direction only
V42B TD	V.42 bis is in use in transmit direction only

14.1.3 +ILRR DTE-DCE local rate report

Format	Description
+ILRR: <rate>	given when +ILRR=1; informs about the local port rate after connection establishment

The +ILRR intermediate result code is given after the (possible) +DR result code.

14.2 De facto

14.2.1 Call repeat restriction result codes

BLACKLISTED and DELAYED. Refer to the dialling command D and GSM 02.07, Annex A.

14.3 GSM 07.07

14.3.1 +CSSI Intermediate supplementary service notification

Format	Description
+CSSI: <code>	given when +CSSN=1 and some supplementary service notification is given by network during MO call establishment

The +CSSI is the first intermediate result code after the dial command D. This result code is enabled and disabled with the +CSSN command.

Defined values

<code>:

0	unconditional call forwarding is active
1	some of the conditional call forwards are active
2	call has been forwarded
3	call is waiting
5	outgoing calls are barred
6	incoming calls are barred
7	CLIR suppression rejected

14.3.2 +COLP Connected line identification report

Format	Description
+COLP: <number>,<type>	Given when +COLP=1 and number received from the network when MO call established

The +COLP intermediate result code is given after the possible +CSSI result code. This result code is enabled and disabled with the +COLP command.

Defined values

<number> string type phone number of the format specified by <type>

<type> type of address octet in integer format (refer GSM 04.08 subclause 10.5.4.7):

129	unknown/telephony
145	international/telephony

14.3.3 +CR Data service report

Format	Description
+CR: REL ASYNC	given when +CR=1 and data call established; informs about the type of data call being established

The +CR intermediate result code is given after a possible +COLP result code during a MO data call setup. During a MT data call setup, this is the first intermediate result code. Note that this result code shall replace the CARRIER result code (when X5 is set). This result code is enabled and disabled with the +CR command.

14.3.4 +CRING Distinctive ring

Format	Description
+CRING: <type>	Given when +CRC=1 and incoming MT call (no active or held calls in ME)

This result code is enabled and disabled with the +CRC command.
NOTE: +CRING replaces the V.25ter RING result code.

Defined values

<type>:

FAX	facsimile (TS 62)
VOICE	normal voice (TS 11)
REL ASYNC	normal data
ASYNC	normal data
VOICE/REL ASYNC	voice followed by data (BS 81)
ALT VOICE/REL ASYNC	alternating voice/data, voice first (BS 61)
ALT REL ASYNC/VOICE	alternating voice/data, data first (BS 61)
ALT VOICE/FAX	alternating voice/fax, voice first (TS 61)
ALT FAX/VOICE	alternating voice/fax, fax first (TS 61)

14.3.5 +CLIP Calling line identification report

Format	Description
+CLIP: <number>,<type>	given when +CLIP=1 and number received from network when MT call received (no active or held calls in ME)

The +CLIP result code is sent to the TE after every RING (or +CRING) result code. This result code is enabled and disabled with the +CLIP command.

Defined values

<number> string type phone number of a format specified by <type>

<type> type of address octet in integer format (refer GSM 04.08 subclause 10.5.4.7):

- 129 unknown/telephony
- 145 international/telephony

14.3.6 +CSSU Unsolicited supplementary service notification

Format	Description
+CSSU: <code>[,<index>[,<number>,<type>]]	given when +CSSN=,1 and some supplementary service notification is given by the network during a MT call setup or during a voice call; note that a remote release of a held call is also informed with this result code

In the MT call setup case, the +CSSU result code is sent to the TE after every possible +CLIP result code. In the case of a waiting call, this is given after the +CCWA result code but discarded if the Nokia 22 is in the on-line data state. This result code is enabled and disabled with the +CSSN command.

Defined values

<index> refer "Closed user group +CCUG"

<code>:

- 0 this is a forwarded call (MT call setup)
- 1 this is a CUG call (also <index> present) (MT call setup)
- 2 call has been put on hold (during a voice call)
- 3 call has been retrieved (during a voice call)
- 4 multiparty call entered (during a voice call)
- 5 call on hold has been released (this is not a SS notification) (during a voice call)
- 7 call is being connected (alerting) with the remote party in the alerting state in an explicit call transfer operation (during a voice call)
- 8 call has been connected with the other remote party in an explicit call transfer operation (number and subaddress parameters may also be present) (during a voice call or a MT call setup)

<number> string type phone number of a format specified by <type>

<type> type of address octet in integer format (refer to GSM 04.08, subclause 10.5.4.7):

- 129 unknown/telephony
- 145 international/telephony

14.3.7 +CCWA Call waiting

Format	Description
+CCWA: <number>,<type>,<class>	given when +CCWA=1 and incoming MT call is received when there is active or held calls in the ME discarded if in the on-line data state

Description

This command allows the controlling of the Call Waiting supplementary service. Activation, deactivation and status query are supported. When querying the status of a network service (<mode>=2), the response line for 'not active' case (<status>=0) should be returned only if the service is not active for any <class>. The parameter <n> is used to disable/enable the presentation of an unsolicited result code +CCWA: <number>,<type>,<class>[,<alpha>] to the TE when a call waiting service is enabled. The command should be abortable when the network is interrogated.

The interaction of this command with other commands based on other GSM supplementary services is described in the GSM standard.

The test command returns the values supported by the TA as a compound value.

Defined values

<n> (sets/shows the result code presentation status in the TA):

0	disable
1	enable

<mode> (when the <mode> parameter is not given, the network is not interrogated):

0 disable

1 enable

2 query status

<class> is a sum of integers each representing a class of information (default 7 equals all classes):

1 voice (telephony)

2 data (usually refer to all bearer services; with <mode>=2 this may refer only to some bearer service)

4 fax (facsimile services)

also all other values below 128 are reserved by this ETS

<status>:

0 not active

1 active

<number>: string type phone number of a calling address in the format specified by <type>

<type>: type of address octet in integer format (refer GSM 04.08 [8] subclause 10.5.4.7)

<alpha>: optional string type alphanumeric representation of <number> corresponding to the entry found in the phonebook; the used character set should be the one selected with the command Select TE Character Set +CSCS

14.3.8 +CREG Network registration

Format	description
+CREG: <stat>[,<lac>,<cid>]	when +CREG=1: given when <stat> value changes; given after NO CARRIER if network lost when on-line when +CREG=2: given when <stat> value changes and when network cell (<lac> and <cid>) of the ME changes; given after NO CARRIER if network lost when on-line

The +CREG result code is enabled and disabled with the +CREG command.

Defined values

<stat>:

- 0 not registered, the ME is not currently searching for a new operator to register to
- 1 registered, home network
- 2 not registered, but ME is currently searching a new operator to register to
- 3 registration denied
- 4 unknown
- 5 registered, roaming

<lac> string type, two byte location area code in hexadecimal format (e.g. "00C3" equals 193 in decimal)

<ci> string type, two byte cell ID in hexadecimal format

14.3.9 +CUSD Network initiated unstructured supplementary service data

Format	Description
+CUSD: <m>,<str>,<dc>	given when +CUSD=1 and network initiated 'notify' or 'request' USSD message received; discarded if in the on-line data state

This result code is enabled and disabled with the +CUSD command.

NOTE: only the first 'request' message during a network initiated USSD session yields to the +CUSD unsolicited result code. The rest are information responses of the +CUSD command.

Defined values

<m>:

- 0 no further user action required (network initiated USSD-Notify, or no further information needed after mobile initiated operation)
- 1 further user action required (network initiated USSD-Request, or further information needed after mobile initiated operation)

<str> string type USSD-string (when <str> parameter is not given, network is not interrogated):

- if <dcsc> indicates that GSM 03.38 default alphabet is used:
- if the TE character set is other than "HEX" (refer to the Select TE command)
- Character Set +CSCS): the Nokia 22 converts the GSM alphabet into current TE character set according to the rules of GSM 07.05, Annex A
- if the TE character set is "HEX": the Nokia 22 converts each 7-bit character of the GSM alphabet into two IRA character long hexadecimal numbers (e.g. character Π (GSM 23) is presented as 17 (IRA 49 and 55))
- if <dcsc> indicates that an 8-bit data coding scheme is used: the Nokia 22 converts each 8-bit octet into two IRA character long hexadecimal numbers (e.g. octet with integer value 42 is presented to the TE as two characters 2A (IRA 50 and 65))

<dcsc> GSM 03.38 Cell Broadcast Data Coding Scheme in the integer format (default 0)

14.3.10 +CME ERROR Mobile equipment error

Format	Description
+CME ERROR: <err>	given instead of ERROR when +CMEE=1 or =2 and error is related to the ME or network operation

Defined values

<err> see Error values section

14.4 GSM 07.05

14.4.1 +CMTI New SMS-DELIVER indication

Format	Description
+CMTI: <mem>,<index>	when +CNMI=0: indications are buffered into the Nokia 22 when +CNMI=1: in the on-line data state, indications are discarded; in the command mode they are forwarded directly to the TE when +CNMI=2: in the on-line data state, indications are buffered into the Nokia 22; in the command mode they are forwarded directly to the TE

See also the +CNMA command.

Defined values

- <mem> memory to which th received SMs are preferred to be stored:
- "SM" SIM message storage

<index> integer type, the location of the message in the defined memory

14.4.2 +CMT New SMS-DELIVER

Format	Description
text mode: +CMT: <oa>,<scts> [,<toa>,<fo>,<pid>,<dcsc>,<sca>,<tosca>,<length>]<CR><LF><data> PDU mode: +CMT: <length> <CR><LF><pdu>	when +CNMI=0: routed messages are buffered into the Nokia 22 (if the buffer is full, 'memory capacity exceeded' is sent to the network) when +CNMI=1: in the on-line data state, the routed messages are rejected (e.g. 'memory capacity exceeded' is sent to the network and when the command mode is entered, 'memory available' is sent to the network); in the command mode they are forwarded directly to the TE when +CNMI=2: in the on-line data state, routed messages are buffered into the Nokia 22 (if the buffer is full, 'memory capacity exceeded' is sent to the network and, when the command mode is entered, 'memory available' is sent to the network); in the command mode they are forwarded directly to the TE

See also +CNMA command.

Defined values

- <oa> GSM 03.40 TP-Originating -Address Address-Value field in string format; the type of address is given by <toa>
- <scts> GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format
- <toa> GSM 04.11 TP-Originating -Address Type-of-Address octet in integer format
- 129 unknown/telephony
- 145 internal/telephony
- <fo> first octet of GSM 03.40 SMS-DELIVER, SMS-SUBMIT, SMS-STATUS-REPORT, or SMS-COMMAND in integer format
- <pid> GSM 03.40 TP-Protocol-Identifier in integer format
- <dcsc> GSM 03.38 SMS Data Coding Scheme in integer format
- <sca> GSM 04.11 RP SC address Address-Value field in string format, type of address given by <tosca>
- <tosca> GSM 04.11 RP SC address Type-of-Address octet in integer format
- 129 unknown/telephony
- 145 internal/telephony
- <length> integer type value that indicates the length of the message body <data> in characters in the text mode (+CMGF=1); or that indicates the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length) in the PDU mode (+CMGF=0).

- <data> SMS: GSM 03.40 TP-User-Data in the text mode responses
- <pdu> GSM 04.11 SC address followed by GSM 03.40 TPDU in the hexadecimal format

14.4.3 +CBM New CBM

Format	Description
text mode: +CBM: <sn>,<mid>,<dc>,<page>,<pages><CR><LF><data> PDU mode: +CBM: <length><CR><LF><pdu>	when +CNMI=0: messages are discarded when +CNMI=1-2: messages are forwarded directly to the TE (CBMs cannot be received during a call)

Defined values

- <sn> GSM 03.41 CBM Serial Number in integer format
- <mid> GSM 03.41 CBM Message Identifier in integer format
- <dc> GSM 03.38 Cell Broadcast Data Coding Scheme in integer format
- <page> GSM 03.41 CBM Page Parameter bits 4-7 in integer format
- <pages> GSM 03.41 CBM Page Parameter bits 0-3 in integer format
- <data> GSM 03.41 CBM Content of Message in text mode responses; format:
 - if <dc> indicates that GSM 03.38 default alphabet is used:
 - if the TE character set is other than "HEX" (refer command +CSCS in GSM 07.07): the Nokia 22 converts the GSM alphabet into the current TE character set according to the rules of Annex A
 - if the TE character set is "HEX": the Nokia 22 converts each 7-bit character of the GSM alphabet into two IRA character long hexadecimal numbers
 - if <dc> indicates that an 8-bit or a UCS2 data coding scheme is used: the Nokia 22 converts each 8-bit octet into two IRA character long hexadecimal numbers
- <length> the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length)
- <pdu> GSM 03.41 TPDU in hexadecimal format

14.4.4 +CDSI New SMS-STATUS-REPORT indication

Format	Description
+CDSI: <mem>,<index>	when +CNMI=0: indications are buffered into the Nokia 22 when +CNMI=1: in the on-line data state, indications are discarded; in command mode they are forwarded directly to the TE when +CNMI=2: in the on-line data state, indications are buffered into the Nokia 22; in the command mode forwarded directly to the TE

Defined values

<mem> memory to which the received SMs are preferred to be stored:

"SM" SIM message storage

<index> integer type, the location of the message in the defined memory

14.4.5 +CDS New SMS-STATUS-REPORT

Format	Description
text mode: +CDS: <fo>,<mr>,[<ra>],[<tora>], <scts>,<dt>,<st> PDU mode: +CDS: <length><CR><LF><pdu>	when +CNMI=0: routed messages are buffered into the Nokia 22 (if buffer is full, 'memory capacity exceeded' is sent to the network) when +CNMI=1: in the on-line data state, the routed messages are rejected (e.g. 'memory capacity exceeded' is sent to the network and when the command mode is entered, 'memory available' is sent to network); in the command mode they are forwarded directly to the TE when +CNMI=2: in the on-line data state routed, messages are buffered into the Nokia 22 (if the buffer is full, 'memory capacity exceeded' is sent to the network and when the command mode is entered, 'memory available' is sent to network); in the command mode, they are forwarded directly to the TE

See also the +CNMA command.

Defined values

<fo> first octet of GSM 03.40 SMS-STATUS-REPORT in integer format

<mr> GSM 03.40 TP-Message-Reference in integer format

<ra> GSM 03.40 TP-Recipient-Address Address-Value field in string format; type of address given by <tora>

<tora> GSM 04.11 TP- Recipient -Address Type-of-Address octet in integer format:

129 unknown/telephony

145 internal/telephony

<scts> GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format

<dt> GSM 03.40 TP-Discharge-Time in time-string format:
"yy/MM/dd,hh:mm:ss±zz"

- <st> GSM 03.40 TP-Status in integer format
- <length> the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length)
- <pdu> GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format

14.4.6 +CMS ERROR Message service failure

Format	Description
+CMS ERROR: <err>	Given instead of ERROR when error is related to ME or network operation

Defined values

<err> see the Error values section

15 ERROR VALUES

15.1 +CME ERROR values

The columns in the following table indicate which AT commands can return the numeric <err> value given in the topmost row. The Numbers in the cells indicate what kind of an error can generate the <err>. The meanings of the numbers are given after the table.

An example of the +CNUM command:

Numeric error values: 1, 5, 10 - 12, 23.

The corresponding errors are: 'external ME is not connected to TA', 'phone security code required to execute the AT command', 'ME does not have a SIM connected to it', 'SIM PIN required to execute the AT command', 'SIM PUK required to execute the AT command'.

Table 5. +CME error values																		
	3	4	5	10	11	12	16	17	18	21	22	23	24	26	27	30	31	100
+CGMM																		
+CGMR																		
+CGSN																		
D><str>	9		1	2	3	4					7	8						
D>mem<n>	9		1	2	3	4				5, 6		8						
+CNUM			1	2	3	4						8						
+CREG?																		
+COPS=	10		1	2	3	4												
+COPS?			1	2	3	4												
+COPS=?			1	2	3	4												
+CLCK=		15	1	2	3	4	11		12			8				13	23	14
+CPWD=			1	2	3	4	11		12			8				13	23	14
+CCWA=			1	2	3	4										13	23	14
+CUSD=			1	2	3	4										13	23	14
+CLCC																		
+CFUN=																		
+CFUN?																		
+CPIN=			1	2	3	4	11					8						
+CPIN?				2														
+CSQ																		
+CPBS?			1	2	3	4						8						
+CPBR=			1	2	3	4				5		8		18				
+CPBR=?			1	2	3	4						8						
+CPBF=			1	2	3	4						8						
+CPBF=?			1	2	3	4						8						
+CPBW=	24	15	1	2	3	4		16	12	5		8	17	18	19			
+CPBW=?			1	2	3	4						8						

- 1 phone security code required to execute the AT command
- 2 ME does not have a SIM connected to it
- 3 SIM PIN required to execute the AT command
- 4 SIM PUK required to execute the AT command

- 5 memory location does not exist
- 6 phonebook memory location is empty
- 7 match in searched string is not found in any of the memory locations
- 8 general memory error; e.g. problems in SIM database communication
- 9 call hold/retrieve/swap/build/split/transfer/deflection failed or cannot be actioned
- 10 manual network selection is not possible because unavailable or forbidden network name was given, or call is active
- 11 invalid password was given
- 12 SIM PUK2 required to execute the AT command
- 13 there is no network service to complete the request
- 14 supplementary service command failed due to an unknown error; i.e. an error that is not covered by other <err> values
- 15 AT interpreter does not support the operation
- 16 SIM PIN2 required to execute the AT command
- 17 alpha entry to be stored is too long
- 18 number to be read/stored is too long
- 19 number to be stored contains characters that are not available in that memory
- 20 SIM interface control is not reserved or the maximum number of applications has reserved the SIM control
- 22 external ME UI cannot be accessed
- 23 network timeout
- 24 entries cannot be stored in the currently selected phone book memory (e.g. on missed calls list)
- 25 there is no active voice call

15.2 +CMS ERROR values

The columns in the following table indicate the SMS AT commands that can return the <err> value given in the topmost row. The numbers in the cells indicate the error that can generate the <err> value. The meaning of the numbers is given under the table. For details on how to read the table, see the example in the previous section.

Table 6. +CMS error values															
	0-127	128-255	301	302	304	305	310	311	312	316	320	321	322	330	331
+CPMS=			5				2	3	1	4	6				
+CPMS?			5				2	3	1	4	6				
+CSCB=			5								6				
+CSAS=			5				2	3	1	4	6	8			
+CSAS=?			5				2	3	1	4	6				
+CRES=			5				2	3	1	4	6	8			
+CRES=?			5				2	3	1	4	6				
+CNMI=			5				2				6				
+CMGL=			5				2	3	1	4	6				
+CMGR=			5				2	3	1	4	6	8			
+CNMA=					11										
+CMGS=	9	10	5		11	12	2	3	1	4				7	16
+CMSS=	9	10	5	14	11	12	2	3	1	4	6	8		7	16
+CMGW=			5		11	12	2	3	1	4	6		13		
+CMGD=			5				2	3	1	4	6	8			
+CMGC=	9	10	5		11	12	2	3	1	4				7	16

- 1 phone security code required to execute the AT command
- 2 ME does not have a SIM connected to it
- 3 SIM PIN required to execute the AT command
- 4 SIM PUK required to execute the AT command
- 5 SMS interface is reserved by some other application
- 6 general memory error; e.g. problems in the SIM database communication
- 7 message to be sent to the network does not contain the SMSC address and the SMSC address cannot be found from the Nokia 22
- 8 memory location does not exist
- 9 RP layer cause value from the network
- 10 TP layer cause value from the network
- 11 PDU mode is enabled: the length of the given PDU is not equivalent with the given <length> or the ME/TA detects that the PDU is of invalid format
- 12 text mode is enabled: too long a message is attempted to be sent/stored, or the +CSMP does not contain a valid SMS-SUBMIT (in the case of +CMGS=), or the ME/TA detects that the PDU is of invalid format
- 13 SMS memory is full
- 14 <index> given in the +CMSS does not contain SMS-SUBMIT or SMS-COMMAND, or <index> given in the +CMSS contains SMS-COMMAND and the <da> is given
- 16 no network service

16 REFERENCES

- /1/ ITU-T Recommendation V.25ter: Serial asynchronous automatic dialling and control; Aug 1995.
- /2/ GSM 07.07: Digital cellular telecommunications system (Phase 2+); AT command set for GSM Mobile Equipment (ME); version 5.4.0; Nov 1997.
- /3/ GSM 07.05: Digital cellular telecommunications system (Phase 2+); Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS); version 5.4.0; Nov 1997.
- /4/ TIA-578-A Facsimile Digital Interfaces - Asynchronous Facsimile DCE Control Standard, Service Class 1; May 1995.
- /5/ TIA-592 Facsimile Digital Interfaces - Asynchronous Facsimile DCE Control Standard, Service Class 2; May 1995.
- /6/ TIA SP-2388: Proposed new standard - Asynchronous Facsimile DCE Control Standard; Aug 1990.
- /7/ TIA PN-3131: Project to complete IS-101 Facsimile Digital Interfaces - Voice Control Interim Standard for Asynchronous DCE; Feb 1995.
- /9/ ITU-T Recommendation G.711: Pulse code modulation (PCM) of voice frequencies; 1993.
- /10/ GSM 03.40: Digital cellular telecommunications system (Phase 2+); Technical realization of the Short Message Service (SMS); Point-to-Point (PP).
- /11/ GSM 03.38: Digital cellular telecommunications system (Phase 2+); alphabets and language-specific information.
- /12/ GSM 03.41: Digital cellular telecommunications system (Phase 2+); Technical realization of the Short Message Service Cell Broadcast (SMSCB).
- /13/ ETS 300 342-1: Radio Equipment and Systems (RES); ElectroMagnetic Compatibility (EMC) for European digital cellular telecommunications system (GSM 900 MHz and DCS 1 800 MHz).

17 EXAMPLE PROCEDURES ON SOME AT-COMMANDS

How to create a data call or send an SMS in text or PDU mode (and how to also check the PIN code or signal quality).

17.1 Inputting PIN CODE

The password (PIN, security code etc.) status can be queried with the +CPIN? –command. If the response is READY, no password is required. If the response is SIM PIN, the Nokia 22 is waiting for a PIN code. It is possible that more than one password is needed. The following example indicates how the PIN code is given to the Nokia 22.

How to input PIN code:

Command from the DCE	Response from the Nokia 22	Explanation
AT+CPIN?<CR>	-	Query about password status
	+CPIN: SIM PIN	PIN code required
	OK	Previous command was succesful
AT+CPIN="1234"	-	Give PIN code 1234 to the Nokia 22
	OK	Previous command was succesful
AT+CPIN?<CR>	-	Query about the password status
	+CPIN: READY	No password required
	OK	Previous command was succesful

How to check network registration (signal quality):

AT+CSQ<CR>	-	Query signal strength.
	+CQ:31, 99	Response +CSQ<rssi>, 99 (*)

(*) Values for <rssi>

0 No network coverage (Check PIN code)
 1-31 Signal strenght

17.2 Initialising the Nokia 22

Command from the DCE	Response from the Nokia 22	Explanation
AT&F<CR>	-	Set to factory defined configuration.
	OK	Previous command was succesful
AT+IFC=1,1<CR>	-	Set the flow control to SW flow control, the default is HW flow control (2,2)
	OK	Previous command was succesful
AT&D0<CR>	-	Ignore DTR changes

	OK	Previous command was succesful
--	----	--------------------------------

Making a data call with Nokia 22:

ATD+358705966200	-	Start connection with dialling the preferred number
	CARRIER	The Nokia 22 has a data connection to the GSM infrastructure
	CONNECT	The connection to the preferred number is established and the application can start sending data

17.3 Sending an SMS from a terminal or other similar application

There are two different modes – the text mode and the PDU (Protocol Data Unit) mode – for handling short messages. The default mode of the Nokia 22 is the PDU mode (+CMGF=0). A PDU quick guide is available at www.forum.nokia.com (the Nokia 22 developer-section). The text mode is easier to understand than the PDU mode.

AT+CMGF=0<CR>	-	Set the Nokia 22 to GSM 07.05 SMS PDU mode (default).
AT+CMGS=29<CR> >0011000C915358508181420000A7 1154747A0E4Acf41f4f29C9E769F41 21	-	Send the message to the defined phone number. The service number is not a mandatory field in the PDU structure. This example does not have the SMSC number.

17.4 Sending a sample SMS in the text mode

Command from the DCE	Response from the Nokia 22	Explanation
AT+CMGF=1	-	Set the Nokia 22 to GSM 07.05 SMS Text mode. The default value is the PDU mode (0).
	OK	Previous command was successful.
AT+CSCA="+358508771010",1 45	-	Set the SMS Service Centre number to be used with an outgoing SMS.
	OK	Previous command was successful.
AT+CMGS="+358705966200",1 45<CR>My SMS<CTRL-Z>		Send the "My SMS" message to defined phone number. 145 specifies the phone number type.
	+CMGS: 60	Data Card responses to successful sending with Message reference number
	OK	Previous command was successful.

17.5 HSCSD command examples

	Connection Type
Wanted air interface user rate	31.1 kHz
9600	AT+CBST=0,0,1;+CHSN=1,0,0,0
14400	AT+CBST=0,0,1;+CHSN=2,0,0,0
19200	AT+CBST=0,0,1;+CHSN=3,0,0,0
28800	AT+CBST=0,0,1;+CHSN=4,0,0,0
43200	AT+CBST=0,0,1;+CHSN=6,0,0,0

	Connection Type
Wanted air interface user rate	v.110
9600	AT+CBST=81,0,1;+CHSN=1,0,0,0
14400	AT+CBST=81,0,1;+CHSN=2,0,0,0
19200	AT+CBST=81,0,1;+CHSN=3,0,0,0
28800	AT+CBST=81,0,1;+CHSN=4,0,0,0
43200	AT+CBST=81,0,1;+CHSN=6,0,0,0

	Connection Type
Wanted air interface user rate	v.120
9600	AT+CBST=51,0,1;+CHSN=1,0,0,0
14400	AT+CBST=51,0,1;+CHSN=2,0,0,0
19200	AT+CBST=51,0,1;+CHSN=3,0,0,0
28800	AT+CBST=51,0,1;+CHSN=4,0,0,0
43200	AT+CBST=51,0,1;+CHSN=6,0,0,0

Q: Can the application or terminal I am using directly receive incoming SMS?

A: The received SMS messages are stored in the SIM card memory "SM" by default. The messages can be read from the SIM card using AT commands, e.g., the +CMGR command.

The +CNMI command (e.g. AT+CNMI=1,2,2,1,0<CR>) allows the application to receive the incoming SMSs directly in all environments.

The following ETSI specifications can be used as a reference when the GSM 07.05 Text- and PDU modes are used: GSM 07.05, GSM 03.03, GSM 03.38, GSM 03.40, GSM 03.41, GSM 04.11.

Q: What standards does the Nokia 22 support?

A: There are several standards that have influenced the design of the Nokia 22. From the application's point of view, the most important standards are those that specify the AT-command interface: ITU-T V.25ter, ETS GSM 07.07, ETS GSM 07.05, TIA-578-A, TIA-592 and TIA SP-2388.

These standards can be obtained from national standards organizations or at www.etsi.fr, www.tiaonline.org and www.itu.ch.